

# Rhodora

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CONTENTS:

- Plants new to or previously unreported from Missouri. *Julian A. Steyermark*..... 97
- Spergularia in North and South America (continued). *Ruth P. Rossbach*..... 105
- Grasses and Sedges of Woodstock, Vermont (review). *C. A. W.*... 143
- Ludwigia microcarpa in Missouri. *Julian A. Steyermark*..... 144
- Pilose Variety of Diervilla Lonicera. *M. L. Fernald*..... 144

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### PLANTS NEW TO OR PREVIOUSLY UNREPORTED FROM MISSOURI

JULIAN A. STEYERMARK

As a result of continued exploration of Missouri by the writer during 1938 and 1939, many species, new to or previously unrecorded from the state, have been added to the flora. A number of them show considerable extensions of range, while some are additions to Gray's Manual.

All specimens mentioned below may be found in the Herbarium of Field Museum of Natural History.

DRYOPTERIS CLINTONIANA (D. C. Eaton) Dowell, var. AUSTRALIS Wherry. Around outlet of Blue Spring, tributary to Big Barren Creek, T25N, R1W, Sect. 14, 10 mi. northwest of Bennett, Carter County, May 22, 1938, *J. A. Steyermark 5333*.

According to Mr. C. A. Weatherby of the Gray Herbarium, the fern may be tentatively referred to this status until there has been more collecting of this particular group of ferns in the South.

If one attempts to key out this specimen according to Small's Ferns of the Southeastern States,<sup>1</sup> he might place it in the category *Dryopteris celsa* (W. Palmer) Knowlton, Palmer & Pollard, on account of the slight and gradual amount of dimorphism between sterile and fertile fronds and the narrowly or broadly lanceolate outline of the leaf-blades with appressed teeth on the segments. However, *Dryopteris celsa* is known only from the coastal plain and adjacent Piedmont region. Otherwise, the fern might fit into *Dryopteris Clintoniana* var. *australis* (*D. australis*), except for the fact that it does not have the

<sup>1</sup> Small, J. K., Ferns of the Southeastern States, pp. 261-262. Lancaster, Pa. 1938.



conspicuously dimorphic sterile and fertile fronds which are supposed to characterize that species.

Until more material from the southern states has accumulated for comparison, there is no means of knowing how much variation occurs in the dimorphism of the sterile and fertile fronds, and, therefore, how trustworthy this character is.

This is the first record for Missouri of the occurrence of this group of ferns related to *Dryopteris Clintoniana*.

SCIRPUS CAMPESTRIS Britton, var. PALUDOSUS (A. Nelson) Fern. Wet swaly ground bordering salt spring and spring branch of Elk Lick Spring, in valley of Heath's Creek, Sect. 17, 3 mi. southwest of Ridge Prairie, Saline County, Oct. 6, 1938, *J. A. Steyermark* 21587.

CAREX WOODII Dewey. Swampy meadow along spring branch along Bennett Bayou, Sect. 30, 5. mi. south of Caulfield, Howell County, April 29, 1938, *J. A. Steyermark* 5237.

This species has been recorded by Mackenzie for Missouri in North American Flora, but this is the first specimen the writer has seen. Dr. F. J. Hermann identified the specimen.

LEMNA MINIMA Philippi. Margin of Tupelo Gum Pond, Irish Wilderness, Sect. 4, Oregon County, May 23, 1938, *J. A. Steyermark* 5365; sink-hole pond, between Moody and South Fork, Sect. 7, 2 mi. south of South Fork, Howell County, April 28, 1938, *J. A. Steyermark* 5222. These specimens were identified by Dr. Lawrence E. Hicks.

TRADESCANTIA CANALICULATA Raf.  $\times$  T. OZARKANA Anderson & Woodson. Wooded slopes of limestone bluffs along White River, west of Big Cedar Hollow, Sect. 13, 4 mi. south of Ocie, 6 mi. southeast of Protem, Taney County, April 30, 1938, *J. A. Steyermark* 5267 and 5268; limestone bluffs at entrance to Patsy Holly, tributary to Little North Fork of White River, T22N, R15W, Sect. 31 and 32, 2½ mi. south of Theodosia, Ozark County, June 11, 1939, *J. A. Steyermark* 27091.

This is the first recorded occurrence of this hybrid. Both the parent species were growing in the immediate vicinity. The specimens had the very glaucous foliage of *T. canaliculata* but the broad leaves of *T. ozarkana*. The calyces were mostly glabrous or sparsely non-glandular-hairy as in *T. canaliculata*.

ISOTRIA VERTICILLATA (Willd.) Raf. This rare species, previously unrecorded for the state, has been found in the Herbarium of Field Museum, collected by *Savage and Shull* from the vicinity of Poplar Bluff, Butler County.

Both species of *Isotria* are now known from Missouri.

GLINUS LOTOIDES L. This member of the *Aizoaceae* has been col-

lected in several counties of western Missouri from alluvial soils. It forms flat spreading patches. Alluvial muddy shore behind zone of *Salix nigra* around Goose Lake, in bottoms of Grand River, Sect. 22, 2 miles south of Clinton, near route No. 13, Henry County, Sept. 26, 1938, *J. A. Steyermark* 7483; open exsiccated ground in black willow-buttonbush thickets, around Stultz Lake, in valley of Marmaton River, T36N, R32W, Sect. 34, 4 miles northwest of Nevada, Vernon County, Sept. 29, 1938, *J. A. Steyermark* 9816; wet open alluvial soil around end of Horseshoe Lake, in bottoms of Marais des Cygnes River, Sect. 29, 1½ miles southwest of Papinsville, Vernon County, Oct. 1, 1938, *J. A. Steyermark* 9959. Also recorded by B. F. Bush from Jackson County in correspondence to the writer.

*SILENE STELLATA* (L.) Ait. f., var. **scabrella** (Nieuwl.), comb. nov. *Eractoma stellata* var. *scabrella* Nieuwl.<sup>1</sup>

The pubescent-stemmed variety is the common type throughout Missouri and adjacent territory. One collection from Butler County, in southeastern Missouri, has glabrous or nearly glabrous stems, and may be referred to typical *Silene stellata*, which is common over the eastern portion of the range of the species.

*PHILADELPHUS PUBESCENS* Lois. Common on north-facing wooded limestone bluffs, ¾ mile southeast of Southwest City, McDonald County, May 31, 1938, *J. A. Steyermark* 5573.

This species of wild Mock Orange has been found in adjacent Arkansas and Oklahoma. Repeated search has been made for it in the southern Missouri Ozarks, but only recently has the writer been able to find it, and in this particular locality it is quite abundant.

*HEUCHERA PARVIFLORA* Bartl. var. *RUGELII* (Shuttlw.) Rosendahl, Butters & Lakela.

Previous collections now referred to this species had been placed in a hybrid category (*H. puberula* × *H. americana* var. *hirsuticaulis*) by Dr. Rosendahl and Dr. Butters.<sup>2</sup> Further collections of this species, made by the writer from the locality in Wayne County, convinced him that they belonged to the *Heuchera parviflora* var. *Rugelii* category, and subsequent study by Dr. Rosendahl served to verify this determination.

The species is found in southern Illinois and this is its first record west of the Mississippi River.

The latest collection made by the writer is from crevices of limestone bluffs, Hall's Bluff, along St. Francis River, south of Davidson's

<sup>1</sup> Am. Mid. Nat. 3: 58. 1913.

<sup>2</sup> See Steyermark, *J. A., Plants New to Missouri*. RHODORA 40: 253. 1938.



Blue Spring, south of Kime, Wayne County, Sept. 1, 1938, *J. A. Steyermark* 6342.

*ROSA SUFFULTA* f. *ALBA* Rehder. Swale barrens along Miami Creek, 2 miles southeast of Merwin, T41N, R33W, Sect. 13, Bates County, June 2, 1938, *J. A. Steyermark* 5708.

The white-flowered form was the common type in this locality.

*LESPEDEZA CUNEATA* G. Don. Field along route no. 61, 4½ miles northeast of Tanner, Scott County, Sept. 17, 1938, *J. A. Steyermark* 6635.

This species has been previously recorded as an introduction in the United States by Dr. Fernald, who found it extensively in various parts of Virginia. The Missouri record, the first from so far west, serves to show how quickly some plants may become established after a brief and recent introduction from a foreign country. The plants, with their tall, bushy, and much-branched stems, covered with crowded, dull dusky-green leaves appressed to the branches, easily stand out as distinct from any of the native American species. The pale creamy-yellow flowers have two broad purplish-rose streaks on the inside of the center at the base of the standard, and are much smaller than those of our native cream- or yellow-colored *Lespedeza capitata* or *Lespedeza hirta*.

*LATHYRUS LATIFOLIUS* L. Prairie swale along railroad tracks, along route No. 63, in valley, 6 miles north of West Plains, Howell County, June 11, 1939, *J. A. Steyermark* 27031.

The Everlasting Pea was definitely established in this locality.

*VICIA DASYCARPA* Ten. Prairie swale along railroad, along route No. 63, in valley, 6 miles north of West Plains, Howell County, June 11, 1939, *J. A. Steyermark* 27030.

This is a rarely introduced species from Europe which has become well established at the locality in Howell County. The strongly gibbous calyx, colored bluish-purple around one end, together with the narrow purple corollas and nearly glabrous stems and leaves stamp this as a distinct and easily recognized species.

*DESMODIUM OBTUSUM* (Muhl.) DC. × *D. MARILANDICUM* (L.) DC.

Hybrid plants between these two species were found in Texas and Wright Counties. The petioles were nearly as long as those of *D. marilandicum* but the petioles and stems were as pubescent as in *D. obtusum*. Various intergradations of petiole-length, pubescence, and size and shape of leaf-blade occurred. Both parent species were growing in the immediate vicinity.

Wooded sandstone slopes in ravine tributary to Roubidoux Creek, just west and south of Plato, T32N, R12W, Sect. 2, Texas County, August 20, 1937, *J. A. Steiermark 25030*; upland cherty woods, 6 miles northeast of Manes, Wright County, August 20, 1937, *J. A. Steiermark 24995*.

*OXALIS VIOLACEA* L. f. *ALBIDA* Fassett. This pure-white-flowered form was collected on a prairie along railroad tracks along route No. 24, 2 miles northwest of Rensselaer, Ralls County, May 14, 1939, *J. A. Steiermark 22471*.

*EVONYMUS RADICANS* Sieb. var. *ACUTA* Rehd. Base of wooded slopes along creek in Possum Hollow, Sect. 28, 2½ miles northwest of Wappapello, Wayne County, Sept. 2, 1938, *J. A. Steiermark 6449*.

This cultivated ornamental plant was well established in this locality.

*ARALIA NUDICAULIS* L. On talus of wooded limestone bluffs along Mississippi River, T56N, R3W, Sect. 12, 1 mile southeast of Ilasco, Ralls County, May 12, 1939, *J. A. Steiermark 22343*; three-fourths way up east-facing limestone bluff-slopes along Mississippi River, T55N, R3W, Sect. 18 and 20, three-quarters to one mile southeast of Ashburn, Pike County, May 13, 1939, *J. A. Steiermark 22371*.

Along the Mississippi River bluffs of northeastern Missouri in Ralls and Pike Counties this species forms large stands at the base of wooded limestone slopes. In this and nearby areas along the Mississippi it is associated with other northern relics, such as *Sambucus pubens* and *Dodecatheon amethystinum*, none of which are known anywhere else in the state.

*DIOSPYROS VIRGINIANA* var. *PLATYCARPA* Sarg., f. *ATRA* Sarg. Upland woods near clubhouse, on top of wooded limestone slopes along Osage River, T37N, R28W, Sect. 6, 2½ miles west of Taberville, St. Clair County, Sept. 27, 1938, *J. A. Steiermark 9614*.

So far as the writer is informed, no other collection of this form of the persimmon has been recorded since it was originally described on the basis of fruiting material from Oklahoma. It may be well, therefore, to give additional data on the tree.

The depressed-globose fruit is colored dark purple- or plum-blue and is glaucous. The skin of the fruit is firmer and tougher than that of typical *Diospyros virginiana*. Several trees were noted in this area and all had the fruit similarly colored, although in adjacent territory were normally colored specimens. The trees averaged about 6 meters tall and had leaves which were mostly pubescent on the lower surface and obtuse to subcordate at the base.

Seeds were sent to the Missouri Botanical Garden and to the Arnold Arboretum for propagative purposes.



DODECATHEON AMETHYSTINUM Fassett. Shaded limestone ledges on bluffs along the Mississippi River, between Lover's Leap and Riverside Cemetery, T56N, R4W, Sect. 27,  $\frac{1}{2}$  mile southeast of Hannibal, Marion County, May 15, 1938, J. A. Steyermark 5318.

This species was originally collected from this locality by Rev. John Davis, but in order to learn whether or not the station was still extant, the writer visited the area, accompanied by Dr. Paul C. Standley. Several bluff areas along the Mississippi River were explored, including Riverview Park and Lover's Leap, but only after a diligent search on the bluffs between Lover's Leap and Riverside Cemetery was the writer able to locate the plants, of which two only were seen. The plants were growing on shaded uppermost ledges of limestone bluffs, just below the top. As is characteristic of *D. amethystinum*, no red color appeared at the base of the leaves, and the capsules, which were beginning to mature, were of a slender linear-oblong type, yellowish-brown, and of a papery texture. Moreover, the calyx-lobes were short, the umbels few-flowered, and the color of the corolla a deep rose or rose-purple. In addition, the leaves of *D. amethystinum* have a pale bluish-green or even glaucous appearance on the upper surface, and this is in marked contrast to the yellowish-green leaves of *D. Meadia*. All the characters above noted point to the recognition of *D. amethystinum* in the field as distinct from *D. Meadia*. The writer first observed typical *D. amethystinum* in the Driftless Area of Wisconsin with Dr. Fassett, and was again impressed at the Missouri locality with the distinctness of this species.

The Hannibal area is the only one in Missouri where *D. amethystinum* has been found. In this area, likewise, are found such northern relics as *Sambucus pubens* and *Aralia nudicaulis*, mingled with a large number of Ozarkian species. In fact, the Ozark element in the flora along the rugged country bordering the Mississippi River north to and somewhat beyond Hannibal, is good evidence that this portion of northeastern Missouri is a "driftless" area and that it escaped glaciation together with the Ozarks. The "driftless" nature of this area is, moreover, enhanced by the occurrence of *Dodecatheon amethystinum* which is so characteristic a species in the famous Driftless Area of Wisconsin.

MIMULUS ALATUS Ait. f. ALBIFLORUS House. This white-flowered form was collected from alluvial woods along the Gasconade River, T40N, R9W, Sect. 15,  $2\frac{1}{2}$  miles northeast of Vienna, Maries County, August 29, 1937, J. A. Steyermark 25590.



CHELONE GLABRA L. f. TOMENTOSA (Raf.) Pennell. This form of the Turtlehead, with the leaves tomentose on the lower surface, was collected at the base of small limestone bluffs along Mill Branch, tributary to Barren Fork, Sect. 21, 4 miles west of Iberia, Miller County, Sept. 19, 1938, *J. A. Steiermark* 6803.

PENSTEMON COBAEA Nutt. Common on top of open shaly limestone outcrops on mound along Miami Creek, 2 miles southeast of Merwin, T41N, R33W, Sect. 13, Bates County, June 2, 1938, *J. A. Steiermark* 5715.

For many years it has been known that the only representative of the *Penstemon Cobaea* group in Missouri belonged to the var. *purpureus* Pennell. This variety, characterized by its rich purple color, is one of the most beautiful of all species of *Penstemon*, and is limited to the White River region of Missouri and Arkansas.

Typical and less showy *Penstemon Cobaea* Nutt., with pale purplish and white corolla, has a much larger range, being found from Nebraska to Texas. The eastern limits for this species bordering Missouri, as shown by Pennell<sup>1</sup> on Map 62 in his *Scrophulariaceae of Eastern Temperate North America*, are easternmost Kansas and southeastern Nebraska. Thus, the area in Bates County, Missouri, where the writer found typical *Penstemon Cobaea* Nutt., is a slight range-extension eastward for the species. Both the typical species and its variety may now be credited to the state, which is the only one to contain both varieties of this beautiful species.

LONICERA DIOICA L. Hanging over and near top of north-facing limestone bluffs along spring branch from Montauk Spring, Montauk State Park, Dent County, May 5, 1939, *J. A. Steiermark* 22126; on north-facing bluffs along creek tributary to Crooked Creek, Montauk State Park, Dent County, May 5, 1939, *J. A. Steiermark* 22132. Material so determined by the writer has been verified by Prof. Alfred Rehder and Mr. E. J. Palmer of the Arnold Arboretum.

For the last three years, the writer has collected material from this locality, but each time was either too early or too late to obtain good flowering specimens which are so essential in this group for certain determination. Altogether six different trips were made to Montauk State Park in vain, and on two of them the writer, while passing through this portion of the Ozarks at night, had to resort to collecting the material by flashlight. Three separate trips this spring finally resulted in the successful collecting of the flowers. However, the

<sup>1</sup> Pennell, F. W., *The Scrophulariaceae of Eastern Temperate North America*. Acad. Nat. Sci., Phila., Monog. 1, p. 248. 1935.

period of anthesis is so short—one week or less (typical of many vernal-flowering species)—that almost weekly trips to the area are essential for checking on the flowering.

At any rate, the corollas of the Missouri specimens above noted are strongly gibbous at the base and are greenish-yellow tinged with rose or purple color on the outside of the corolla-tube. The leaves and stems are wholly glabrous. In all these respects the plants are characteristic *Lonicera dioica*. The chief difference lies in the fact that the lower surface of the leaves on the Missouri specimens is not nearly as glaucous as in typical *L. dioica*. How much taxonomic value lies in this slight difference, cannot at present be stated, and further study may show the lack of a decided glaucous character on the lower surface of the Missouri specimens to be correlated with other differences.

*LOBELIA CARDINALIS* f. *ALBA* (A. Eaton) St. John. Occurring with typical *Lobelia cardinalis* in moist places at base of north-facing limestone bluffs along Fiery Fork Creek, Sect. 3, 2½ miles southwest of Barnumtown, Camden County, Sept. 22, 1938, *J. A. Steyermark* 6950; exsiccated low meadow in valley of Mill Creek, T26N, R7E, Sect. 9, 1¾ miles southwest of Wappapello, in Butler County, August 29, 1938, *J. A. Steyermark* 6254.

*ASTER DRUMMONDII* Lindl. × *A. CORDIFOLIUS* L.

Specimens referred to this hybrid category were collected in Jefferson and Atchison Counties. In these plants the leaves were cordate as in *A. cordifolius*, but the stems, petioles, and lower surface of the leaves were covered with a short pubescence characteristic of *A. Drummondii*. Both the parent species occurred in the immediate vicinity.

*ERIGERON RAMOSUS* (Walt.) BSP. f. *DISCOIDEUS* (Robbins) Fern. Collected in Vernon, Bates, Carroll, and Benton Counties. Open places along roadside, 2 miles northwest of Lamar, Vernon County, June 1, 1938, *J. A. Steyermark* 5630; cherty slopes above limestone bluffs along Osage River, T40N, R23W, Sect. 13, 2½ miles west of Warsaw, Benton County, June 3, 1938, *J. A. Steyermark* 5780; shale openings in oak-hickory woods, bordering valley of Tater Creek, 2 miles north of Coloma, T55N, R24W, Sect. 25, Carroll County, June 25, 1938, *J. A. Steyermark* 6167.

In all cases noted, the rayless form was growing with the species.

*LAPSANA COMMUNIS* L. On shaded gravelly banks along Jack's Fork of Current River, around bridge over route No. 17, Sect. 36, 5½ miles southeast of Arroll, Texas County, June 23, 1939, *J. A. Steyermark* 27168.



Plants belonging to this species were well established in this locality and had spread over a radius of a few hundred feet.

FIELD MUSEUM OF NATURAL HISTORY  
Chicago, Illinois.

## SPERGULARIA IN NORTH AND SOUTH AMERICA

RUTH P. ROSSBACH

(Continued from page 83)

7. *S. RUBRA* (L.) J. & C. Presl (PLATE 589, FIGS. 6a-6c). Annual or short-lived perennial: *caudex* simple, bearing 3- $\infty$  diffuse or prostrate stems which in turn may branch several times, 3-33 cm. long; *internodes of stem below the inflorescence* slender, glabrous, rarely sparsely glandular-pubescent, 2-35 mm. long, 0.5 mm. or less in diameter; *leaves* fascicled, linear-filiform, strongly mucronate, scarcely fleshy, 3.5-25 mm. long, 0.4-1.2 mm. wide, usually glabrous, or sometimes glandular-pubescent; *stipules* conspicuous, triangular-acuminate, usually shining, but sometimes dull, white or reddish, 2.5-5 mm., usually 3.5-5 mm. long; *inflorescence* a leafy, many-flowered cyme with *internodes* usually sparsely glandular-pubescent, not markedly differentiated from the lower parts of the stem; *bracts* duplicating leaves at the lower nodes, often smaller at the upper, sometimes only 2 mm. long; *sepals* lanceolate, usually glandular-pubescent, often densely so, 3.5-5 mm., usually 4-4.5 mm. long; *petals* pink, ovate, 2.4-3.8 mm. long, always shorter than the sepals; *stamens* 6-10, usually 10 but when less in number aborted ones are often present; *styles* 3, 0.6-0.8 mm. long, divided to base; *mature capsules* 3.5-5 mm. long, equaling the calyx; *fruiting pedicels* filiform, glandular-pubescent, reflexed or not, the lower 3.5-13 mm. long; *seeds* dark brown, rounded or if crowded in the capsule, truncate at the summit and angular in outline, deeply sculptured in closely interwoven, vermiform pattern with minute, dark, hard papillae scattered over the surface, most numerous on and often confined to the swollen rim, 0.4-0.6 mm. long, not winged.—Fl. Čechica, 94 (1819); C. Presl, Fl. Sic. 160 (1826); Gray, Man. 65 (1848), also through ed. 4., and Gen. ii. 28, pl. 108 (1849); Torrey, Pacific R. R. Report—Botany, iv. 70 (1857), probably not as to plants described (Corte Madera collection was of *S. media* and *S. macrotheca*, *q. v.*);<sup>1</sup> Syme, English Bot. ed. 3. ii. 129, pl. 254 (1873), good figure; Torrey, Wilkes Explor. Exped. xvii, Botany, 247 (1874), probably not at all as to plants described, which include a mixture of presumably all the common species of the Pacific coast; Chapman, Fl. So. U. S. ed. 2, 48 (1884), not as to plants described which are *S. marina*, *q. v.*; Robins. in Proc. Am. Acad. xxix. 309 (1894); Robins. in

<sup>1</sup> Martinez collection has not been found.

Gray, Synop. Fl. i. 250 (1897); Arech. in Anal. Mus. Nac. Montevideo, iii. (Fl. Uruguay) i. 91 (1901), though probably not as to plants described; Robins. & Fernald in Gray, Man. ed. 7, 378 (1908); Henry, Fl. So. Br. Columbia & Vancouver Island, 118 (1915); Rydberg, Fl. Prair. & Plains, 322, fig. 205 (1932); St. John, Fl. Se. Wash. and Adjac. Idaho, 144 (1937). *Arenaria rubra* L. Sp. Pl. i. 423 (1753) and Fl. Succ., ed. 2. 152 (1755); Smith, Eng. Bot. xii. 852 and fig. (1801), figure poor; Fries, Fl. Hall. 76 (1818);<sup>1</sup> DC. Prod. i. 401 (1824); Torrey, Fl. N. and Mid. U. S. 456 (1824); Cham. & Schlecht. in Linnaea, i. 53 (1826), probably not as to plants described which are a mixture of species made insufficiently clear to separate; Hooker, Fl. Bor.-Am. i. 98 (1830), including only the *Scouler* collection, excluding the collection "Canada, Mrs. Percival" which is *S. canadensis*;<sup>2</sup> Hooker & Arnott, Bot. Beechey Voy. 11 (1830), not as to plants discussed, for they refer to Cham. & Schlecht. l. c.; Bigelow, Fl. Bost., ed. 3, 191 (1840); Hooker & Arnott, Bot. Beechey Voy. 325 (1840), only in part as to plants, but references deal with mixtures of species. *Alsine rubra* (L.) Crantz, Inst. ii. 407 (1766),<sup>3</sup> excluding ♂; C. A. Mey. Verz. Pfl. Cauc. 217 (1831); Webb & Berth. Phyt. Canar. i. 148 (1840); House in Am. Midl. Nat. vii. 133 (1921). *Arenaria campestris* Allioni, Fl. Pedem. ii. 114 (1785), Linnaean phrase-name quoted.<sup>4</sup> *Stipularia rubra* (L.) Haworth, Syn. Pl. Succ. 103 (1812). *Lepigonum rubrum* (L.) Wahlb. Fl. Gothob. 45 (1820); Koch, Syn. Fl. Germ. et Helv. ed. 2, i. 121 (1843); Wimm. Fl. Schles. ed. Goepp. i. 78 (1844); Kindb. Synop. Lepig. 5 (1856) and Mon. Lepig. 40, t. iii, fig. 29 (1863), figure good; Wats. Smithson. Misc. Coll. no. 258 (Bibl. Index), 103 (1878). *Buda rubra* (L.) Dumort. Fl. Belg. 110 (1827); Wats. & Coulter in Gray, Man. ed. 6, 89 (1889). *Melargyra rubra* Raf. Fl. Tellur. iii. 81 (1836), no reference to Linnaeus nor to anyone else, *nomen nudum*. *Spergula rubra* α Torrey & Gray, Fl. N. A. i. 175 (1838) (β is *S. marina* and γ is *S. media*). *Spergula rubra* (L.) Dietr. Syn. Pl. ii. 1598 (1840); Darby, Bot. So. States, 244 (1866), not as to plants described which are probably *S. marina*, *q. v.* *Spergula marina* Dufour ex Steud. Nom. ed. 2. ii. 617 (1841), *nomen nudum* given as a synonym of *Arenaria rubra* L. *Spergula maxima* Dufour, l. c., *nomen nudum*, given as synonym of *A. rubra* L. *Lepigonum rubrum* γ *perennans* Kindb. in Bot. Not. 10 (1858) and Mon. Lepig. 41 (1863). *Spergularia campestris* (L.) Aschers. Fl. Brandenb. i. 94 (1864);<sup>5</sup>

<sup>1</sup> This reference is given by Index Kewensis under *Lepigonum* but that combination is only implied and *Arenaria rubra* was the actual name used.

<sup>2</sup> The other two collections, Dr. Richardson and Mr. Morrison, have not been found in the Kew Herbarium.

<sup>3</sup> Does not refer to Linnaeus directly but gives the Linnaean phrase-name under *Arenaria rubra*.

<sup>4</sup> The epithet *campestris* here probably has its source in *Arenaria rubra* α *campestris* L. Sp. Pl. i. 423 (1753). The citations of *A. rubra* α *campestris* by many European authors subsequent to and referring to Linnaeus are left out of the synonymy above because the identity of α *campestris* is not known (see discussion).

<sup>5</sup> Has its source in *Arenaria rubra* α *campestris* L. but *S. rubra* is clearly described.



Rohrb.<sup>1</sup> in Mart. Fl. Bras. xiv. pt. 2, 267 (1872), not as to South American plants discussed which are probably *S. villosa*, *q. v.*; Rohrb.<sup>1</sup> in Linnaea, xxxvii. 229 (1871-73), not as to plants discussed which are *S. villosa*, *q. v.*; Arech. in Anal. Mus. Nac. Montevideo, iii. (Fl. Uruguay i.), 92 (1901), not as to plants discussed which probably are *S. Bocconi* or *S. villosa*; Hegi, Fl. Mit.-Eur. iii. 422, t. 108, fig. 1 (1911), figure good; Macbride, Field Mus. Nat. Hist. Pub. Bot. xiii.—Fl. Peru, pt. ii. no. 2, 631 (1937). *Spergularia rubra*  $\alpha$  *campestris* (L.) Fenzl in Lebeb. Fl. Ross. ii. 167 (1844-46). *Spergularia rubra* var. *campestris* Gray, Man. ed. 5, 95 (1867), no author given for *campestris* but he probably referred to Linnaeus. *Fasciculus ruber* (L.) Dulac, Fl. Hautes-Pyr. 245 (1867). *Tissa rubra* (L.) Brandegee in Proc. Calif. Acad. ser. 2, ii. 131 (1889), collection cited not seen, though it may not be *S. rubra*; Britt. in Bull. Torr. Bot. Club, xvi. 127 (1889); Greene, Fl. Francisc. 128 (1891); K. Brandegee in Zoe, iv. 84 (1893), no authority given for *rubra* but she undoubtedly referred to Linnaeus, certainly not as to plants discussed, since *T. Clevelandi* is a synonym for *S. villosa* although stated by Mrs. Brandegee to be *T. "rubra, the perennial form"*; Greene, Man. Bot. San Francisc. Bay, 36 (1894); Reiche, Fl. Chile, i. 196 (1896); Britt. & Brown, Illus. Fl. ii. 37, fig. 1516 (1897); Howell, Fl. Nw. Coast, 89 (1903); Piper, Contrib. U. S. Nat. Herb. xi. (Fl. State Wash.) 263 (1906); Piper & Beattie, Fl. Se. Wash. & Adjac. Idaho, 97 (1914) and Fl. Nw. Coast, 145 (1915); Wootton & Standley, Contrib. U. S. Nat. Herb. xix. (Fl. New Mex.) 235 (1915); Rydberg, Fl. Rocky Mts. 279 (1917), also ed. 2 (1922); Tidestrom, Contrib. U. S. Nat. Herb. xxv. (Fl. Utah and Nevada) 197 (1925). *Tissa campestris* (L.) Prantl in Engler & Prantl, Naturl. Pflanzenfam. iii. 1b, 85 (1889). *Corion rubrum* (L.) N. E. Brown in Syme, Eng. Bot. ed. 3. Suppl. 48 (1891). *Tissa rubra* var. *perennans* (Kindb.) Greene, Pitt. ii. 229 (1892); Jepson, Fl. W. Mid. Calif. 170 (1901); Piper, Contrib. U. S. Nat. Herb. xi (Fl. State Wash.) 264 (1906). *Spergularia rubra* var. *perennans* (Kindb.) Robins. in Gray, Synop. Fl. N. Am. i. 250 (1897); Jepson, Fl. Calif. 494 (1914) and Man. Fl. Pl. Calif. 360 (1923); Munz, Man. So. Calif. 163 (1935). *Buda campestris* (L.) Kuntze, Rev. Gen. iii. pt. 2, 13 (1898), at least partly, not as to plants, which are *S. villosa*. *Spergula campestris* (L.) Murb. in Lunds Univ. Arsskrift, xviii. no. 3. 33 (1922), in obs.—NORTH AMERICA: in sandy or gravelly soils, chiefly of roadsides, railroad tracks, and waste places. Newfoundland, south to Maryland (rarely to Alabama), westward locally to Michigan; Vancouver Island to southern California, eastward locally to Montana, Idaho, Wyoming and New Mexico. Also occurring locally in South America, in Colombia and Chile. Introduced from Europe. NEWFOUNDLAND: St. John's, Fernald & Wiegand 5369, July 31, 1911 (U. S., B.). ISLE ST. PIERRE: Savoyard, *Le Hors* xxv-2a, September 6, 1934 (G.). QUEBEC: Newport, Gaspé Co., Victorin et al. 44900, August 1, 1931

<sup>1</sup> I have seen no specimens marked *Spergularia campestris* by Rohrbach.

(G.). PRINCE EDWARD ISLAND: High Bank, Kings Co., *Fernald & St. John* 11050, July 29, 1914 (G., U. S., U. C., coarse perennial). NEW BRUNSWICK: Rexton, Kent Co., *Blake* 5734, September 24, 1923 (G., U. S.). NOVA SCOTIA: sandy roads and wastes, Halifax, Halifax Co., *Macoun* 320, May 19, 1883 (U. S.). MAINE: Dover, Piscataquis Co., *Fernald* 379, August 5, 1895 (G., U. S., N. E. B. C.); Biddeford Pool, York Co., *Kennedy*, July 23, 1901 (G., N. E. B. C.). NEW HAMPSHIRE: Carroll, Coös Co., *Pease* 12696, July 13, 1910 (N. E. B. C.); Rye, Rockingham Co., *B. L. Robinson* 702, June 14, 1903 (G., N. E. B. C., a large perennial). VERMONT: Mt. Holly, Rutland Co., *W. W. Eggleston* 148, July 8, 1898 (G., N. E. B. C.). MASSACHUSETTS: Sharon, Norfolk Co., *Poole* 86, August 1896 (G.); Oak Bluffs, Martha's Vineyard Island, *Scymour* 1198, June 28, 1916 (G., N. E. B. C., U. S.). RHODE ISLAND: Westerly, Washington Co., *Woodward*, July 20, 1917 (G.); Old Harbour, Block Is., Newport Co., *Fernald, Hunnewell, and Long* 9471, August 21, 1913 (G., N. E. B. C., a large, short-noded plant). CONNECTICUT: Winsted, Litchfield Co., *Blewitt* 654, June 30, 1909 (N. E. B. C.). NEW YORK: Brooklyn, *Heuser*, August 25, 1893 (B.). NEW JERSEY: West New York, Hudson Co., *Van Sickle*, June 10, 1895 (U. S.); Scotts, Middlesex Co., *Mackenzie*, May 28, 1922 (G.). PENNSYLVANIA: between Churchtown Road and Beartown, Lancaster Co., *Heller* 508, September 6, 1892 (G., U. S.). MARYLAND: near Baltimore, *J. D. Smith*, May 9, 1878 (U. S.). DISTRICT OF COLUMBIA: Washington, *A. Ruth* 205, May 25, 1912 (Cal. Acad.). ALABAMA: in saline sand on shore, Westfowl River, *C. Mohr*, June, 1870 (D. S.). MICHIGAN: near Litchfield, Hillsdale Co., *W. T. Wallace*, July 7, 1896 (G.). IDAHO: Moscow Mts., Latah Co., *Eastwood & Howell* 3172, June 24, 1936 (G., Cal. Acad.); Santee Creek Bottoms, Kootenai Co., *Leiberg* 1029, June 24, 1895 (U. C., Ore., Pom.); Clearwater R. between Lewiston and Lapwai, Nez Perces Co., *G. B. & R. P. Rossbach* 309, July 26, 1936 (G.). WYOMING: Old Faithful, Yellowstone Nat. Park, *P. H. Hawkins* 521c, July 2-7, 1922 (U. S., scrubby with short internodes); Norris Geyser Basin, Yellowstone Nat. Park, *E. A. Mearns* 3153, August 10, 1902 (U. S., D. S., a very large plant, typical of what Kindberg and Greene meant by var. *perennans*). NEW MEXICO: Albuquerque, *C. L. Herrick*, September 25, 1894 (U. S.). MONTANA: Granite, Granite Co., *F. D. Kelsey*, July 15, 1892 (D. S., Pom.). CALIFORNIA: Upland, Riverside Co., *I. M. Johnston* 117, May 6, 1917 (U. C., D. S., Pom.); Pacific Grove, Monterey Co., *C. Dudley*, August, 1926 (Cal. Acad., a scrubby short-noded plant); Wanona, Mariposa Co., *J. T. Howell* 365, June 2, 1924 (Cal. Acad.); San Francisco, *Greene*, April 22, 1891 (U. S., Notre Dame, U. C., cited by Greene in Pitt. ii. 229 as basis for his var. *perennans* and, although a coarse perennial, not larger than is characteristic for *S. rubra*); Metcalf's Ranch, near Mt. Eddy, Siskiyou Co., *Heller* 12126, July 18, 1915 (G., Cal. Acad., D. S.). OREGON: Siskiyou, Jackson Co., *Eggleston* 11507, August 6-7, 1915 (U. S.);



Seal Rock, Lincoln Co., *M. E. Peck* 10550, August 15, 1921 (D. S.); Sisters, Crook Co., *Roxana S. Ferris & Rena Duthie* 547, June 27, 1919 (D. S.); Lower Albina, Portland, Multnomah Co., *E. P. Sheldon* S.10316, May 12, 1902 (G., U. S., Ore., D. S., Pom.). WASHINGTON: Columbia River, w. Klickitat Co., *Suksdorf* 2081 (G., U. S., U. C., D. S.); Satsop, Chehalis Co., *A. A. & E. G. Heller* 4026, July 8, 1898 (G., U. S., U. C., B.); Lake Crescent, Clallam Co., *Geo. N. Jones* 3593, August, 1931 (W.); near Friday Harbor, San Juan Island, *N. K. Berg* 7, Sept. 28, 1904 (D. S.). BRITISH COLUMBIA: Victoria, Vancouver Island, *C. F. Newcombe*, May 28, 1912 (Newcombe). MEXICO: San Luis Potosí, *Schaffner* 1371b, 1876 (G.). COLOMBIA: Bogota, *Perez Arbelaez* 1198, August, 1931 (U. S.). CHILE: PROV. CONCEPCION: Dept. Concepcion, Concepcion, *Claude-Joseph* 4940, November 19, 1927 (U. S.); Penco, Bahia de Concepcion, *Barros* 279, November 6, 1937 (G.). PROV. BIO-BIO: Dept. Traiquen: Puren, *Claude-Joseph* 5926, January, 1929 (U. S.). PROV. CAUTIN: Dept. Imperial: Riberas de Cholchol, *Montero* 2010, November 30, 1934 (G.). PROV. VALDIVIA: Dept. Valdivia: Corral, *Claude-Joseph* 3268, November 11, 1925 (U. S.).

In general habit *S. rubra* varies from small prostrate plants with short internodes, forming a turfy mat, to large, slender-stemmed, diffuse plants with very long internodes. Since all other characters, such as type of stipule, sepal, capsule, and seed are ever constant, these general habit-differences, which are probably due to ecological conditions, do not warrant any special recognition. Var. *perennans*, described by Kindberg from Sweden as a perennial with very long stems, and later taken up by Greene, Robinson, Jepson, and others, differs from the species in none of the fundamental characters. Large perennials with either long or short internodes can be found anywhere within the range and probably are perennial because of favorable conditions.

In the Linnaean Herbarium there are two specimens under *Arenaria rubra*. One is marked *rubra* and with the number 6 which is the number of the species under *Arenaria* in Sp. Pl. i. 423 (1753). The plant agrees exactly in all characters with the species under discussion. This plant, labeled 6. *rubra*, is, then, the TYPE SPECIMEN of *Arenaria rubra* L.<sup>1</sup>

The other sheet<sup>1</sup> filed under *rubra* is marked only by the number 6. and a sign  $\Theta$ , meaning Hasselquist. There is no name or other inscription upon the sheet. The plant is stouter than the last, with deltoid, shorter, non-lacerate stipules, more fleshy leaves and larger

<sup>1</sup> Photograph in Gray Herbarium through the courtesy of Mr. C. A. Weatherby.

capsules protruding beyond the calyx. Since there are no seeds present on the plant, one does not dare to say exactly what it is but it surely resembles *S. marina*. Whether this was incorrectly thought to belong to *Arenaria rubra*, or is the type of *α. campestris* or of *β. marina* no one can now say. *β. marina* L. does not need this specimen as type for there are others which are probably the basis for this variety which has its origin in L., Hort. Cliff. (see discussion of *S. marina*).

This brings up the question of the identity of *Arenaria rubra α. campestris* L. As is shown above, probably no type of *α. campestris* exists in the Linnaean Herbarium. The fact that Linnaeus says in Sp. Pl. i. 424 (1753) under *Arenaria rubra*,

“*Habitat α. in Europae arenosis collibus, β. in litoribus marinis.*

*Stamina in campestri certe 10 sunt; in maritima prope Aboam stamina tantum 5 observavit D. Kalm*”,

shows that he was comparing only two entities, and not three. He presumably considered *α. campestris* and *β. marina* as two parts of a composite species and therefore *α. campestris* is that part of *A. rubra* which is not *β. marina*.

8. S. BOCCONI (Scheele) Foucaud (PLATE 589, FIGS. 7a-7c). Annual: *caudex* bearing 1-many diffuse, much branched stems 5-30 cm. high; *internodes of stem below the inflorescence* usually glabrous, the upper occasionally glandular-pubescent, 6-33 cm. long, 0.8-1.6 mm. in diameter; *leaves not fasciated* or only slightly so, mucronate, fleshy, 10-45 mm. long, 0.4-1 mm. wide, usually glabrous, occasionally glandular-pubescent above; *stipules* deltoid, 2-4 mm. long, *dull white, scarcely acuminate*; *inflorescence* sometimes a lax cyme but more often densely filled with many short-pedicelled flowers giving a crowded appearance; *internodes* glandular-pubescent, the lowest 5-25 mm. long and 0.4-0.8 mm. in diameter; *bracts* foliaceous and glabrous below, minute and glandular-pubescent above, 1-30 mm. long; *sepals* ovate, glandular-pubescent, 2.4-5.4 mm. long; *petals* white, pink or rosy, 1.6-3.2 mm. long, as much as 0.4-1.2 mm. shorter than the calyx; *stamens* 6-10; *styles* 3, separated to the base, 0.4-0.6 mm. long; *mature capsules* 2.8-5.4 mm. long, equal to or as much as 1 mm. longer than the calyx; *fruiting pedicels* filiform, glandular-pubescent, usually not reflexed, the lowest 4-23 mm., usually 4-12 mm. long, the upper mostly much shorter; *seeds* light brown, often silver-tinged, usually very plump with a broad, swollen rim, surface irregularly reticulated or roughened, minutely glandular-papillate, 0.4-0.6 mm. long, not winged. —Foucaud ex Merino in Mem. Soc. Esp. Hist. Nat. ii. 496 (1904). *Alsine Bocconi* Scheele in Flora, xxvi. 431 (1843).<sup>1</sup> *Lepigonum diandrum*

<sup>1</sup> Scheele gives a reference to *Arenaria Bocconi* Soleirol, which was previously pub-



sensu Kindb. Synop. Lepig. 7 (1856),<sup>1</sup> non *Arenaria diandra* Guss. (1827). *L. campestre* Kindb. Mon. Lepig. 35, t. iii. fig. 23 (1863). *Spergularia atheniensis* Aschers. in Schweinfurth, Beitr. Fl. Aethiop. 305 (1867).<sup>2</sup> *S. campestris* (Kindb.) Nym. Consp. 123 (1878), non *S. campestris* (L.) Aschers. Fl. Prov. Brandenb. 94 (1864), which has its source in *Arenaria rubra*  $\alpha$ . *campestris* L. (1753). *Tissa luteola* Greene, Pitt. v. 114 (1903). *Corion atheniense* (Aschers.) Merino, Fl. Galic. i. 519 (1905). *Alsine atheniensis* (Aschers.) Druce in Proc. Linn. Soc. 77 (1907). *Alsine luteola* (Greene) House in Am. Midl. Nat. vii. 134 (1921).—NORTH AND SOUTH AMERICA: introduced from the Old World to the Pacific coast of North America from California to Oregon and in a few of the largest cities of temperate South America. CALIFORNIA: San Fernando, Los Angeles Co., Abrams 6606, July 7, 1917 (D. S.); Avalon, Santa Catalina Island, Los Angeles Co., John I. Carlson, June 13, 1915 (Cal. Acad.); back dunes, Surf, Santa Barbara Co., Munz 11381, May 17, 1929 (G., Pom.); Pacific Grove, Monterey Co., Heller 6797, May 28, 1903 (Notre Dame, G., U. S., Ore., D. S., Pom., U. C., type collection of *Tissa luteola* Greene); alkali country, 3 mi. sw. of Merced, Merced Co., J. T. Howell 1003, May 9, 1925 (Cal. Acad.); foothills west of Los Gatos, Santa Clara Co., Heller 7499, June 13, 1904 (G., U. S., B., D. S., U. C.); Durant Ave., by cement walk, Berkeley, Alameda Co., H. A. Walker 603, June 7, 1907 (U. C.); San Francisco, San Francisco Co., K. Brandegee, June, 1889 (G., marked *S. salina* var. *sordida* Robins. Synop. Fl. N. Am.). OREGON: Lower Albina, Portland, Multnomah Co., E. P. Sheldon S.9932 July 21, 1902 (Ore.); ballast, Linnton, J. C. Nelson 702, June 17, 1916 (G., D. S.). CHILE: Valparaíso, Prov. Aconcagua, Mauricio Berth 934, October, 1930 (G.); Concepcion, Prov. Concepcion, Jaffuel 2912, December, 1931 (G.); Concepcion, Prov. Concepcion, Claude-Joseph 3901 (U. S.). ARGENTINA: Alrededores de La Plata, Las Talas, Prov. Buenos Aires, Cabrera 1825, November 1, 1931 (La Plata); without indicated locality, Hicken 480 (G., Cal. Acad.). URUGUAY: Pocitos-Malvin, Montevideo, Herter 70449, June, 1924 (B.); Montevideo, Sello 2295d (B., one marked *L. rubrum* by Kindb., 1861); ad margine viarum, Montevideo, Gibert 990 (K.); without indicated locality, Gibert 169, July, 1868 (K.).

*S. Bocconi* thrives in ballast and along sidewalks and roadsides. It is easily distinguished from *S. rubra* by its shorter stipules, more fleshy, not densely fascicled leaves, and its smaller seeds. It is

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lished by Steudel, Nom. ed. 2. i. 123, 125 (1840), as a synonym, without description, for *Arenaria media* and which has its source in an herbarium name.

<sup>1</sup> Although the description is insufficient to indicate whether Kindberg was really describing the same plant as Gussone (1827), the situation is cleared by Kindberg in Mon. Lepig. 35 (1863) where he cites this reference as synonymous with *L. campestre*, which undoubtedly is the plant under discussion here.

<sup>2</sup> *Spergularia atheniensis* Aschers. has its source in an herbarium name, *Spergularia rubra*  $\beta$ , *atheniensis* Heldr. & Sart. published as a synonym of *Leptogonum campestre* by Kindberg, Mon. Lepig. 35 (1863).

quickly separated from *S. marina* by its smaller capsules and smaller, silvery-tinged seeds.

9. *S. CANADENSIS* (Pers.) G. Don (PLATE 589, FIGS. 2a-2d and MAP 6). Annual: with 1-many, prostrate or decumbent, widely branching stems 3-25 cm. long; internodes of stem below the inflorescence glabrous, 3-25 mm. long, 0.4-1.4 mm. in diameter: leaves linear, fleshy, blunt, not mucronate, glabrous, 6-45 mm. long, 0.6-2 mm. broad; stipules deltoid, as long as or shorter than broad, 1-2.8 mm. long: inflorescence open, leafy, not differentiated from the lower parts of the plants; internodes 3-28 mm. long, 0.4-0.8 mm. in diameter; bracts 3-35 mm. long: sepals ovate, blunt, always glabrous, 2.2-3.2 mm. long; petals white or pink, ovate, 1.6-2.6 mm. long, occasionally equal to, usually 0.4-1 mm. shorter than the calyx; stamens 2-5, usually 3-4; styles 3, separated to the base, 0.3-0.4 mm. long: mature capsules 3.6-5.2 mm. long, as much as 0.8-2.6 mm. longer than the calyx or once-and-a-half to twice the length of calyx: fruiting pedicels filiform, usually reflexed, glabrous, rarely sparsely glandular-pubescent, 4-15 mm. long: seeds brown, dull, rounded at the summit, surface nearly smooth or with minute and irregular reticulate thickenings, occasionally with ridges near the point of attachment, very often with long, delicate, glandular pubescence, especially on the swollen rim at the summit, 0.8-1.4 mm., usually 1-1.3 mm. long, often entirely or partially surrounded by a white, cross wing about 0.3 mm. wide, or not at all winged.—Gen. Hist. Dichl. Pl. i. 426 (1831), in part as to plants, including "capsules rather globose . . . valves broad and blunt," excluding "hispid" plants which were probably *S. marina*; Robins. & Fernald in Gray, Man. ed. 7. 378 (1908); Fernald & Wiegand in RHODORA, xii. 161 (1910); J. K. Henry, Fl. So. Brit. Columb. and Vanc. Isl. 118 (1915) (the plants discussed probably belong to the variety of this species). *Arenaria rubra* β. Michx. Fl. Bor.-Amer. i. 274 (1803). *A. canadensis* Pers. Syn. i. 504 (1805), based upon the Michaux plant; Pursh, Fl. Am. Sept. i. 319 (1814); DC. Prod. i. 401 (1824); Steud. Nom. ed. 2. i. 123 (1840). *A. rubra* sensu Hook. Fl. Bor.-Am. i. 98 (1830) in part, including the references *A. canadensis* Pers. and Pursh, excluding all other references which probably belong to *S. rubra* and *S. marina*,<sup>1</sup> non L. (1753). *Mclargyra canadensis* Raf. Fl. Tellur. iii. 81 (1836), nomen nudum. *Lepigonum canadense* Fisch. & Mey. Ind. Sem. Hort. Petrop. iii. 14 (1837), nomen nudum. *Alsine canadensis* (Pers.) Heynh. Nom. 38 (1840); House in Am. Midl. Nat. vii. 134 (1921). *Arenaria marina* sensu Bigelow, Fl. Bost. ed. 3, 191 (1840), in part, including reference *A. canadensis* Pers., non *A. rubra* var. *marina* (L.) 1753. *Spergula canadensis* (Pers.) D. Dietr. Syn. Pl. ii. 1598 (1840). *Lepigonum medium* sensu Wats. Smithson. Misc. Coll.

<sup>1</sup> Hooker here seemed to include all North American *Spergularias* under *A. rubra* L. Of the four specimens cited, Canada, Mrs. Percival, is *S. canadensis*; Straits of De Fuca, Dr. Scouler, is *S. rubra*; Dr. Richardson's & Mr. Morrison's collections have not been seen by the author.

No. 258.—(Bibl. Index), 103 (1878), in part, including only those synonyms referring to *S. canadensis*, excluding those referring to *S. media* and *S. marina*, non *Arenaria media* L. (1762). *Tissa salina* sensu Britt. in Bull. Torr. Bot. Club, xvi. 127 (1889), as to description, non *Spergularia salina* Presl (1819). *Buda borealis* Wats. in Wats. & Coulter in Gray, Man. ed. 6, 90 (1889). *Spergularia borealis* (Wats.) Robins. in Proc. Am. Acad. xxix. 312 (1894) and in Gray, Synop. Fl. 252 (1897). *Tissa canadensis* (Pers.) Britton in Mem. Torr. Bot. Club, v. 152 (1894); Britt. & Brown, Ill. Fl. ii. 37, fig. 1515 (1897).—NORTH AMERICA: in mud or muddy sand of the coast near upper tide limit and often covered by water at high tide, Newfoundland and Quebec to Long Island, New York; and along the southern coast of Alaska and the Queen Charlotte Islands.<sup>1</sup> NEWFOUNDLAND: muddy brackish shore, Savage Cove, Straits of Belle Isle, *Fernald & Long* 28148, August 29, 1925 (G.); brackish or saline strand near Isthmus Cove, Pistolet Bay, *Wiegand, Gilbert & Hotchkiss* 28147, August 5, 1925 (G.); muddy strand, Port Saunders, *Fernald & Wiegand* 3328, August 6, 1910 (G.); strand, Southeast Arm, Bonne Bay, *Fernald & Wiegand* 3330, August 31, 1910 (G., U. S.); wet brackish sand, Stephenville Crossing, Bay St. George, *Fernald & Wiegand*, 3329, August 14, 1910 (G.); damp depressions in sand and gravel, back of barrier beach, Argentia, Avalon Peninsula, *Fernald, Long & Dunbar* 26646, August 26, 1924 (G.); without definite locality, *La Pylaie* (B.). QUEBEC: Saguenay Co.: moist sand of seashore, Bonne Esperance, *J. A. Allen* 43, August 28, 1882 (G.); rocky shore, limestone, Ile St. Geneviève, Mingan Islands, *St. John* 90412, September 9, 1915 (G., Can.); Ile du Havre de Mingan, *Victorin & Rolland* 25544, August 22, 1926 (G.); Ile à la Chasse, *Victorin & Rolland* 18869, July 26, 1924 (G.); gravelly shore, Pointe au Maurier, Charnay, *St. John* 90413, August 26, 1915 (G., Can.); salt marsh, Petites Bergonnes, *A. S. Pease* 24096, September 8, 1934 (G.). Charlevoix Co.: vicinity of Cap à l'Aigle, *John Macoun*, August 14, 1905, 66768 & 66770 (G.), 66769 (G., U. S.); marais saumâtre à l'est de la baie, Baie Saint Paul, *Victorin, Rolland & Jacques* 34089, August 23, 1930 (G., Cal. Acad., Can.). Temiscouata Co.: Notre Dame du Portage, *Victorin* 703, August, 1914 (G.); brackish margin of St. Lawrence River, Cacouna, *Collins & Fernald* (Pl. Exsic. Gray 209) August 31, 1904 (G., U. S., D. S., U. C., Cal. Acad., W., Can.). Kamouraska Co.: muddy shore of St. Lawrence River, Ste. Anne, *Svenson & Fassett* 1099, August 10, 1923 (G.). Rimouski Co.: salt marsh, St. Lawrence R., Bic, *Fernald & Collins* 1030, July 25 & 26, 1907 (G., Can.); prairie saumâtre au bord de la mer, Sainte-Luce, *Victorin, Rolland & Jacques* 33215, August 20, 1930 (G.); salt marsh near the wharf, Bic, *Collins & Fernald*, July 15–18, 1904 (G.). Matane Co.: shore of salt marsh near mouth of Matane R. below high tide, Matane,

<sup>1</sup> Perhaps this occurs also on Vancouver Island, though more collections are needed to verify this supposition.



*F. F. Forbes*, August 6, 1904 (G.). Gaspé Co.: salt marsh at mouth of Rivière Ste. Anne des Monts, Tourelle, *Fernald & Smith* 25718, August 29, 1923 (G., Can., Cal. Acad.). Bonaventure Co.: brackish shore, New Carlisle, *Williams & Fernald*, July 28, 1902 (G.); marais saumâtres, Carleton, *Victorin, Rolland & Jacques* 33294, August 11, 1930 (G., Cal. Acad.). Anticosti Island: Anse au Sanatorium, *Victorin* 4211, August, 1917 (G., U. S., D. S.); Rivière aux Beesies, *Victorin* 4212, August 24, 1917 (G., U. S.). Without definite locality: embouchure du fleuve St. Laurent, *André Michaux* (Paris, TYPE, photograph in G.). MAGDALEN ISLANDS: Cap aux Meules, Ile de l'Étang-du-Nord, *Victorin & Rolland* 9883, August 11, 1919 (G., U. S.) immature; wet brackish sand at the margin of a pond southwest of Étang-du-Nord village, Grindstone Island, *Fernald, Bartram, Long & St. John* 7431, July 24, 1912 (G.). PRINCE EDWARD ISLAND: Prince Co.: salt marsh, Tignish, *Fernald, Long & St. John* 7429, August 6, 1912 (G., U. S., Can., Cal. Acad.); damp brackish sand, Alberton, *Fernald & St. John* 7432, July 11, 1912 (G., Can., U. S.). Queens Co.: border of salt marsh, Bunbury, *Fernald, Long & St. John* 7428, August 28, 1912 (G.); salt marsh, Mt. Stewart, *Fernald, Bartram, Long, & St. John* 7433, July 30, 1912 (G., Can., Cal. Acad., U. C.). NEW BRUNSWICK: Gloucester Co.: brackish marsh along Middle River, Bathurst, *S. F. Blake* 5369, August 13, 1913 (G., U. S., W., Cal. Acad.); shore of Shippigan Island, Lameque, *Blake* 5538, August 26, 1913 (G., U. S.); sandy beach, Tracadie, *Blake* 5636, September 10, 1913 (G.). Northumberland Co.: beach of Miramichi Bay, Loggieville, *Blake* 5618, September 5, 1913 (G.); brackish sands, Bay du Vin Island, *Blake* 5703, September 18, 1913 (G.). Albert Co.: salt marsh, Upper New Horton, *Fassett* 2245, August 22, 1924 (G.). St. John Co.: salt marsh, Quaco, *Fassett* 2241, August 20, 1924 (G.). Charlotte Co.: salt marsh, Utopia, St. George, *Fassett* 2242, August 29, 1924 (G.); Grand Manan Island, *J. R. Churchill*, August 4, 1891 (G.). NOVA SCOTIA: Cape Breton Co.: seashore, Sydney, *C. A. Hamilton* 18299, July, 1890 (Can.). Halifax Co.: on pebbly beach, Purcell's Cove, Halifax Harbor, *Howe & Lang* 1571, September 2-6, 1901 (G.). Kings Co.: sandy shore, Starr's Point, *Fernald*, August 23, 1902 (G.). Queens Co.: damp sand flats and tidal wash, Central Port Mouton, *Graves, Long & Linder* 21181, August 16, 1920 (G.). Shelburne Co.: upper border of gravelly strand, Villagedale, *Fernald, Long & Linder* 21188, August 7, 1920 (G., Can., U. S.). Yarmouth Co.: gravelly and rocky seabeach, Lower Argyle, *Fernald, Bissell, Graves, Long & Linder* 21189, August 11, 1920 (G.). MAINE: Washington Co.: between tide marks, Eastport, *W. G. Farlow*, September, 1877 (G.); beach near Point of Main, Machiasport, *M. A. Barber*, August 24, 1898 (G.). Hancock Co.: beach at Broad Cove, Somes Sound, Mt. Desert Is., *C. E. Faxon*, September 4, 1895 (G.). Waldo Co.: sand and gravel along seashore, about at high-tide mark, west shore of 700-Acre Island, Islesboro, *G. B. Rossbach* 370, August 25,

1931 (N. E. B. C.). Cumberland Co.: salt marsh, Cumberland, *E. B. Chamberlain*, July 26, 1901 (G.); near shore, southwest part of Ragged Island, Casco Bay, *Rodney H. Truc*, September 4, 1921 (Penn.). York Co.: river bank, a mile from mouth, Kennebunkport, *Walter Deane*, July 12, 1894 (G.). NEW HAMPSHIRE: Rockingham Co.: Little Harbor, Rye, *E. F. Williams*, September 19, 1901 (G.); Hampton, *E. F. Williams*, September 22, 1901 (G.). MASSACHUSETTS: Middlesex Co.: banks of Charles River, Cambridgeport, *B. L. Robinson*, September 18, 1898 (G.). Norfolk Co.: Fossil Ledge, Braintree, *Kennedy*, Nov. 30, 1888 (G.). Barnstable Co.: North Dennis, Cape Cod, *C. N. Brainerd*, July 14, 1879 (G.). CONNECTICUT: mud flats near shore of Long Island Sound, Old Lyme, *Woodward*, July 27, 1917 (G.). NEW YORK: Centerport, *A. C. Cook*, 1887 (U. S.). BRITISH COLUMBIA: San Juan Harbor, Vancouver Island, *Rosendahl* 2059, August 12, 1907 (G.); Tlell, Graham Is., Queen Charlotte Islands, *W. A. Newcombe*, July 24, 1925 (Newcombe). ALASKA: shores of Naha Bay at Loring, *Thos. Howell* 1615, August 15, 1895 (U. S., U. C.); sands covered at high tide, Bay of Pillars, Kuiu Island, *Henderson* 14665, August 19, 1932 (Ore.); Klawak, *A. & A. Krause* 554b (B.); margin of sea in tide flats, Sitka, *Luella G. Smith* 157, August 2, 1933 (Ore.).

*S. canadensis* may be quickly recognized by its decumbent habit and glabrous, fleshy stems and leaves, its capsules much exceeding the blunt sepals, and usually by its very large seeds. It differs from *S. marina* in having larger seeds (which, if they are glandular-papillose, have very long papillae) more protruding capsules, usually shorter sepals, and nearly always more glabrous surfaces. It differs from the introduced *S. media* in more prostrate growth, shorter stipules, smaller flowers and capsules, 2-5 stamens instead of 9-10, shorter styles, and usually larger seeds which may be glandular-pubescent.

The geographical distribution of *S. canadensis* is interesting because it is restricted to the northeastern and northwestern coasts. It has evidently never been collected anywhere between, on the Arctic coasts, although John Macoun<sup>1</sup> reports a collection from James Bay by *Burgess*. This specimen has not been located at the herbarium in Ottawa but the great probability is that it would belong to *S. canadensis* because the locality would be roughly in the same latitude as the known range. However, it may have been *S. marina*. Since this species is strictly maritime, often growing just below high-tide

<sup>1</sup> Geol. & Nat. Hist. Survey Canada—Cat. Canad. Pl. pt. i, 80 (1883).

limits, it would not be expected in the interior. Why it does not occur on the northern coasts is hard to say; but temperature is probably one limiting factor. There are other maritime plants with very similar broken ranges, such as *Polygonum Fowleri*<sup>1</sup> and *Senecio Pseudo-arnica*,<sup>2</sup> though the latter extends along the north-eastern coasts of Asia. Professor M. L. Fernald also suggests *Coelopleurum lucidum* and *Glaux maritima* var. *obtusifolia* as having similar ranges.

10. Var. **occidentalis**, var. nov. Caulibus erectis, sparse villosoglandulosis vel glabris: stipulis triangularibus, quam longis tam latis vel longioribus quam latis, 1.6–3.2 mm. longis: sepalis non obtusis, glabris vel villosoglandulosis, 3–4.6 mm. longis; staminibus 2–5; stylis 3, ad basim divisis, 0.3–0.6 mm. longis: capsulis maturis 4.4–6.4 mm. longis, sepalis 0.4–2.4 mm. longioribus vel sepalis minus quam sesqui-longioribus: seminibus eis varietatis typicae similibus, quamquam vulgo 0.9–1.1 mm. longis.—NORTH AMERICA: Along the coast from northern California to Vancouver Island. CALIFORNIA: salt marsh, Humboldt Bay, Humboldt Co., *Rattan*, June, 1878 (G.). OREGON: brackish mud-flat, 3 miles west of Tillamook, on road to Bayocean, Tillamook Co., *G. B. & R. P. Rossbach* 642, June 22, 1938 (G.); salt marsh, Bayocean, Tillamook Co., *Henderson* 11550, July 31, 1929 (U. C.). WASHINGTON: brackish clay near mouth of Palix River, Willapa Bay, 15 miles south of Raymond, Pacific Co., *G. B. & R. P. Rossbach* 644, June 26, 1938 (G. TYPE, D. S., U. C., U. S., W., Cal. Acad., B.); brackish clay, Willapa Bay, just north of the Palix River, about 11 miles south of Raymond, Pacific Co., *G. B. & R. P. Rossbach* 645, June 26, 1938 (G., D. S., B., Cal. Acad., U. S., Ore., W.); salt marsh, Westport, Grays Harbor Co., *H. C. Cowles* 518, July 10, 1907 (G.); on the coast, Olympic Mts., Clallam Co., *Elmer* 2746, August, 1900 (D. S., Pom., Ore.); open muddy places in salt marsh, near Blyn at head of Sequim Bay, Clallam Co., *G. B. & R. P. Rossbach* 646, July 6, 1938 (G., D. S., Cal. Acad., U. C., B., W., Ore., F. M., Pom.); muddy tidewater, northern part of Hood Canal, 1 mile north of Brinnon, Jefferson Co., *G. B. & R. P. Rossbach* 649, July 6, 1938 (G., D. S., W., Ore.); salt marsh, 8 mi. north of Eldon on the Hood Canal, Jefferson Co., *G. B. & R. P. Rossbach* 651, July 6, 1938 (G., D. S., U. S., Cal. Acad., Pom., U. C., W., Ore., B.); salt marsh at mouth of Perry Creek, 5 miles north of Olympia, Thurston Co., *G. B. & R. P. Rossbach* 652, July 6, 1938 (G., D. S., U. C., Cal. Acad., U. S., B., W., Ore.); salt marsh at Steilacoom, Pierce Co., *G. B. & R. P. Rossbach* 654, July 7, 1938 (G., D. S., Cal. Acad., U. C., U. S., W., Ore.); shores of Puget Sound at Steilacoom, Pierce Co., *J. W. Thomp-*

<sup>1</sup> See map 25 in Fernald, Mem. Gray Herb. ii (Persistence of Plants in Unglaci-ated Areas of Boreal America) (1925).

<sup>2</sup> See map 28 in Fernald, l. c.



son 9960, August 22, 1933 (U. C., Pom., D. S., U. S.); wet hollows in beach at high tide line, Silverdale, Kitsap Co., *I. C. Otis* 1639, June 27, 1929 (W.); Fort Lawton, Seattle, King Co., *Eastwood* 9620, June 19, 1920 (Cal. Acad.); Seattle, King Co., *Piper* 694, June 20, 1889 (W.); Bellingham Bay near Whatcom, Whatcom Co., *Suksdorf* 954, July 15, 1890 (G., U. C.); Friday Harbor, San Juan Co., *N. K. Berg* 88, July 3, 1904 (D. S.). VANCOUVER ISLAND: Saanitch Inlet, *Newcombe*, September 12, 1917 (Newcombe); Esquimalt Indian Reserve, *Newcombe*, June 6, 1920 (Newcombe); Nanaimo, Discovery Bay, *Eastwood* 9870, June 26, 1920 (Cal. Acad.); vicinity of Nanaimo, *John Macoun* 78518, June 24, 1908 (Can.); Nanaimo, *John Macoun* 2761, June 10, 1887 (Can.); salt marshes, Nanoose Bay, *Carter* 508, September, 1916 (G., Newcombe); Comox, *John Macoun* 13, June 27, 1893 (Can.).

Var. *occidentalis* differs from the typical form of the species in having a more erect habit, often a more glandular pubescence, usually somewhat larger stipules and a capsule which does not so much exceed the calyx. These plants could not be called *S. marina* because of their large seeds which, if they are glandular-pubescent, have very long, slender papillae. They cannot belong to the introduced *S. media*, because the flowers and capsules are too small, the seeds sometimes pubescent, the stamens 2-5, instead of 9-10, and the styles usually too short. They are treated as a variety of *S. canadensis* because the seeds are like those of that species.

11. *S. MEDIA* (L.) Presl (PLATE 590, FIGS. 1a-1c). Annual or perennial (?): *caudex* bearing 1- $\infty$  erect or prostrate stems 5-40 cm. tall; *internodes of stem below the inflorescence* 6-30 mm. long, 1-2.2 mm. thick, usually glabrous, occasionally the upper sparsely glandular-pubescent; *leaves* in fascicles of 1-3 in the axils, occasionally not fascicled, not mucronate or with a very short mucro, 10-50 mm. long, 0.8-2 mm. wide, glabrous or sometimes the upper sparsely glandular-pubescent; *stipules* deltoid, sometimes shortly acuminate, 2.5-6 mm. long, as long as or slightly longer than broad; *inflorescence* with *internodes* 3.5-30 mm. long, 0.4-0.8 mm. thick, and foliaceous *bracts* 1-25 mm. long, the upper minute; *sepals* narrowly ovate, 2.8-6 mm. long, usually 4-5 mm., glabrous, sometimes glandular-pubescent; *petals* white, ovate, 2.5-4.5 mm. long; *stamens* 9-10; *styles* 3, divided to the base, 0.5-1 mm. long; *mature capsules* 4.5-8 mm., usually 5.5-7 mm. long, sometimes equal to the calyx or as much as 4 mm., usually 1-2.5 mm. longer than the calyx; *fruiting pedicels* reflexed or not, usually glandular-pubescent, sometimes glabrous, 4-23 mm. long; *seeds* dark brown, smooth or very slightly roughened with low elongate mounds,<sup>1</sup>

<sup>1</sup> Especially noticeable in some of the collections from Chile and Juan Fernandez Islands.

not sculptured but sometimes with delicate, vermiform tracies, 0.6–1.1 mm., usually 0.8–1 mm. long, though occasionally not winged usually surrounded by a scarious, white or brown-tinged wing somewhat erose or entire at the margin, sometimes with a brown zone next to the seed, 0.1–0.4 mm. wide.—Fl. Sic. i. 161 (1826); Gray, Man. ed. 5, 95 (1867), as to source of name but not as to description which applies to smooth-seeded plants of *S. marina*; Rohrb. in Mart. Fl. Bras. xiv, pt. 2, 272 (1872), including only 1: "Forma capsula calyce sesqui vel duplo longiore" and the synonymy given; excluding 2. "Forma capsula calycem aequante . . .", which is a mixture of *S. ramosa* and *S. villosa*; Wats. Bot. King Exp. 42 (1871), as to source of name, but collection cited, *Watson* 177, is *S. marina* with smooth seeds; Rohrb. in Linnaea, xxxvii. 242 (1871–73), including only "1. Forma genuina," excluding "2. Forma capsula calycem aequante vel vix superante." for the most part, which is a mixture of *S. media*, *S. ramosa*, *S. villosa*, *S. colombiana*, etc.<sup>1</sup> and excluding "3. Forma dense caespitosa humilis capsula calyce brevior," which is *S. villosa*, *q. v.*; Robins. in Gray, Synop. Fl. i. pt. i, 252 (1897); Robins. & Fernald in Gray, Man. ed. 7, 379 (1908); Vallentin & Colton, Illus. Pl. Falkl. Is. 13 (1921), figure good; Macbride, Field Mus. Pub. Bot. xiii. (Fl. Peru pt. ii.) 632 (1937), not as to plant cited which is *S. fasciculata*, *q. v.* *Arenaria media* L. Sp. Pl. ed. 2, 606 (1762); Pers. Synop. i. 504 (1805); DC. Prod. i. 401 (1824); Hook. & Arn. in Hooker, Bot. Misc. iii. 147 (1832), including collections by *Gillies* and *Bridges*, excluding collections by *Cruickshanks* and *Cuming* 550 which are *S. villosa*, *q. v.*; Gay, Fl. Chile i. 267 (1845), as to source of name, but description applies to *S. villosa*, *q. v.*; Hooker, Fl. Antarct. i. pt. 2, 250 (1847), including also var.  $\beta$ . *A. marina* sensu Smith, Eng. Bot. xiv. 958 and fig. (1802), including  $\beta$  (in all probability the plants described are all *S. media*), non *A. rubra*  $\beta$ . *marina* L. (1753). *A. marginata* DC. in Lam. & DC. Fl. France, iv. pt. 2, 793 (1805) and Ic. Pl. Gall. Rar. 15, t. 48 (1808), figure good. *A. marginata* Schlecht. in Ges. Naturfors. Freunde Berl. Mag. vii. 212 (1816), very indefinite description. *Stipularia media* (L.) Haworth, Syn. Pl. Succ. 103 (1812). *Lepigonum medium* sensu Wahlb. Fl. Gothob. 46 (1820), gives *Arenaria rubra*  $\beta$ . *marina* L. as a synonym,<sup>1</sup> non *Arenaria media* L. (1762). *L. marinum* sensu Wahlb. l. c. 47, who gives *Arenaria media* L. as a synonym,<sup>2</sup> non *A. rubra*  $\beta$ . *marina* L. (1753). *L. medium* (L.) Fries, Nov. Fl. Suec. Mant. iii. 33 (1839); Koch, Syn. Fl. Germ. ed. ii, i. 121 (1843), in part, probably a mixture of *S. marina* and *S. media*; Kindb. Synop. Lepig. 14 (1856), as to source of name but probably not at all as to plants discussed because they are placed under "microtheca" and the capsule is described

<sup>1</sup> Here there is such an involved mixture of species among the citations and synonyms that an explanation is not attempted. However, the references and citations may be found in their place in the monograph.

<sup>2</sup> Wahlberg evidently interchanged the Linnaean epithets *marina* and *media* in making his new combinations.

as slightly exceeding calyx, which is more characteristic of *S. marina*; Kindb. Mon. Lepig. 24, t. ii, fig. 11 (1863), *S. marina* as to plants for same reason as above; Wats. Smithson. Misc. Coll. No. 258 (Bibl. Index) 103 (1878), as to source of name and including part of the synonyms, the remaining, too numerous to take up, pertain to *S. marina* and *S. canadensis*; Brewer & Wats. Geol. Survey of Calif. ed. 2, Bot. Calif. i. 71 (1880), probably *S. marina* as to description. *Spergula media* (L.) Bartl. in Bartl. & Wendl. Beitr. Bot. ii. 64 (1825). *Alsine marina* var.  $\beta$ . Mert. & Koch in Roehl. Deutsch. Fl. ii. 293 (1826), with *A. media* L. as a synonym. *Buda media* (L.) Dumort. Fl. Belg. 110 (1827). *Arenaria rubra* sensu Hook. & Arn. Bot. Beechey Voy. 11 (1830),<sup>1</sup> non L. (1753). *Alsine marginata* (DC.) C. A. Mey. Verz. Pfl. Cauc. 217 (1831), non *A. marginata* Schreb. Spicil. Fl. Lips. 31 (1771), which is a *Spergula*; Reichenb. Fl. Germ. 566 (1832); House in Am. Midl. Nat. vii. 133 (1921). *A. marginata* Fenzl, Verbreit. Alsin. tab. ad. p. 18 (1833), *nomen nudum*. *Melargyra media* Raf. Fl. Tellur. iii. 81 (1836), *nomen nudum*. *Spergula rubra*  $\gamma$ ? Torr. & Gray, Fl. N. A. i. 175 (1838). *Aren. marina* var.  $\beta$ . Bertol. Fl. Ital. iv. 685 (1839). *A. maritima* Steud. Nom. ed. 2, i. 125 (1840), founded upon a name with pre-Linnaean basis but given as a synonym for *A. media* L. *Lepigonum marginatum* (DC.) Koch, Syn. Fl. Germ. ed. 2, i. 121 (1843). *Spergularia marginata* (DC.) Kittel, Taschenb. ed. 2, 1003 (1844); Boreau, Fl. Centr. Fr. ed. 3, ii. 106 (1857); Arech. in Anal. Mus. Nac. Montevideo, iii. (Fl. Uruguay i.) 91 (1901); Fernald & Wiegand in RHODORA xii. 161 (1910). *S. media*  $\beta$ . *marginata* (DC.) Fenzl in Ledeb. Fl. Ross. ii. 168 (1844-46). *Lepigonum marinum* (Wahlb.) Kindb. Synop. Lepig. 12 (1856), non *Arenaria rubra*  $\beta$ . *marina* L. (1753). *L. marinum* sensu Kindb. Mon. Lepig. 18, t. i, fig. 6 (1863), for the most part but excluding the synonyms *S. macrocarpa* Presl, *S. rupestris* Camb., *Arenaria rubra*  $\beta$ . *marina* L., *Arenaria marina* All. and others, non *Arenaria rubra*  $\beta$ . *marina* L. (1753). *A. litoralis* Philippi in Linnaea, xxviii. 673 (1856). *Spergularia rubra* sensu Torrey, Pacific R. R. Rep.—Bot. iv. 70 (1857), including only synonyms *A. media* L. and *A. marginata* DC., part of the Corte Madera specimen being *S. media*, the other plant *S. macrotheca*,<sup>2</sup> non *Arenaria rubra* L. (1753). *Lepigonum marinum* subsp. *dubium* Kindb. Mon. Lepig. 21, t. i, fig. 5 (1863). *Spergularia media* var. *macrocarpa* sensu Gray, Man. ed. 5, 95 (1869), excluding synonym *S. macrocarpa* Presl which pertains to *S. ramosa*, non *S. macrocarpa* Presl (1831). *Lepigonum medium* var. *macrocarpa* sensu Wats. Smithson. Misc. Coll. no. 258 (Bibl. Index) 103 (1878), non *Spergularia macrocarpa* Presl (1831). *Corion medium* (L.) N. E. Brown in Syme, Engl. Bot. ed. 3, Suppl. 49 (1891) and in Druce, Bot. Exch. Club Brit. Isl. Rep. for 1892 (1893). *Tissa marina* sensu Greene,

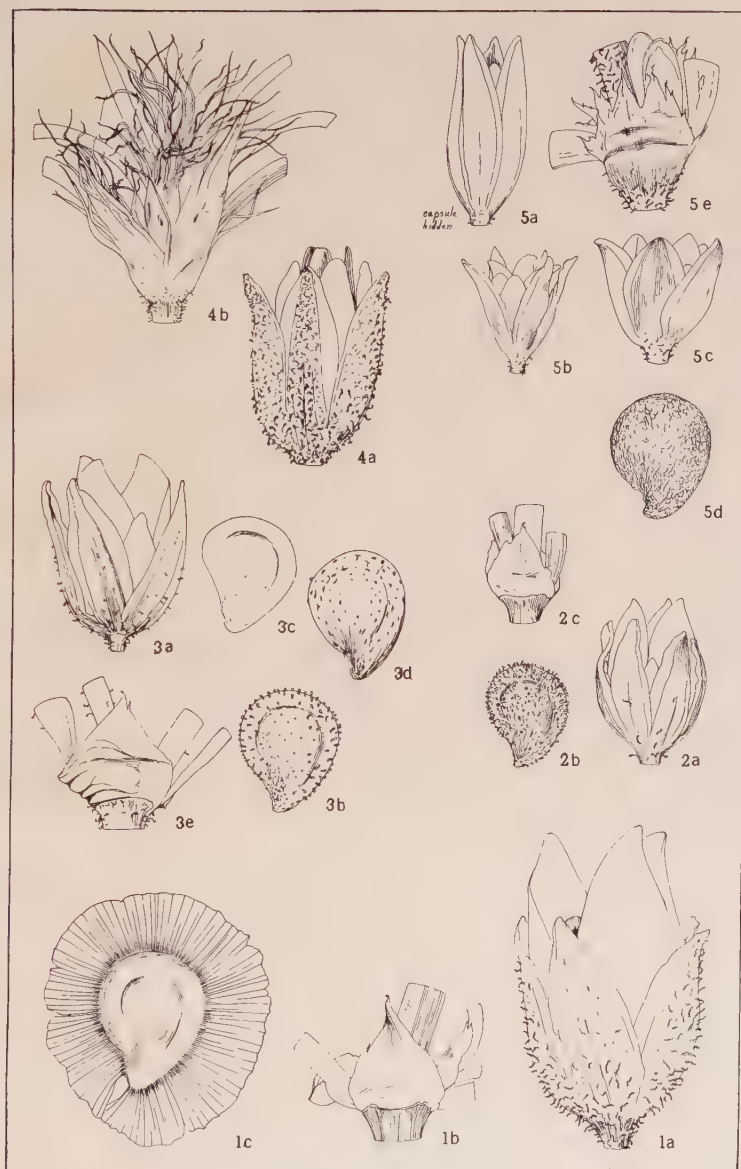
<sup>1</sup> There is a specimen in Herb. Hooker at Kew, Beechey, Concepcion, mounted on a sheet of *A. media* by Hooker.

<sup>2</sup> I have not been able to find the Martinez collection cited here.



Fl. Francisc. 128 (1891), non *Arenaria rubra*  $\beta$ . *marina* L. (1753); sensu Greene, Man. Bot. San. Francisc. Bay 37 (1894), non *A. rubra*  $\beta$ . *marina* L. (1753). *Buda marina* sensu Macloskie, Rep. Princeton Univ. Exp. Patagonia, viii. i. pt. 5, 395 (1905), non *A. rubra*  $\beta$ . *marina* L. (1753). *Alsine media* (L.) Druce in Ann. Scot. Nat. Hist. 221 (1906), based upon *Arenaria media* L. (1762), non *Alsine media* L. Sp. Pl. i. 272 (1753), which is a *Stellaria*. *Tissa marginata* (DC.) Heller, Muhlenbergia, vi. 96 (1910). *Spergularia maritima*<sup>1</sup> Chiov. in Ann. Bot. Roma, x. 22 (1912), no description but gives *A. marginata* DC. as a synonym. *Spergularia maritima* Hill ex Druce, Rep. Bot. Exch. Cl. Brit. Isles, iii. pt. 5, 438 (1914), as synonymous of *S. media* Presl. *S. alata* Wiegand in RHODORA, xxii. 15 (1920).—NORTH and SOUTH AMERICA: introduced from Europe in New York at Shelter Island and in saline places in the interior; in Marin Co., California and in Oregon. Also in Chile, where it may not be introduced, from Prov. Santiago south to Chiloe; on the Juan Fernandez and Falkland Islands and about ports in Argentine and Uruguay. NEW YORK: head of Coscles Inlet, Shelter Island, *House* 9694, August 15, 1923 (G.); salt pond east of Montezuma, Cayuga Co., *Metcalf & Wiegand* 6406, July 4, 1916 (G., type collection of *S. alata* Wiegand); salt flats east of village, Montezuma, *Eames, Randolph & Wiegand* 12004, September 9, 1919 (G., cited under *S. alata* by Wiegand); on island by Cayuga Bridge, *Muenschner* 16953, August 5, 1927 (G.); saline clay about salt sheds, south of Liverpool, Syracuse, Onondaga Co., *Fernald, Wiegand & Eames* 14278, August 31, 1922 (G.); salt springs, Syracuse, Onondaga Co., *E. C. Webster* (G.); salt marsh, Syracuse, Onondaga Co., *Wiegand* 27, August 18, 1902 (G.); near Baldwinsville, *Beauchamp*, 1894 (G.); salt marsh, southeast corner of Onondaga Lake, Syracuse, Onondaga Co., *Wiegand* 6409, September 14, 1916 (G.); Onondaga Lake, *Kirkwood*, July, 1903 (U. S.). CALIFORNIA: salt flats on south side of bridge across head of Drake's Estero, Marin Co., *Ferris & Wiggins* 8117, July 19, 1935 (G.); Almonte, Marin Co., *Eastwood*, July 15, 1920 (Cal. Acad.) and same locality, *Eastwood* 10595, June 9, 1921 (Cal. Acad.); Tiburon, Marin Co., *Michener & Bioletti*, April, 1891 (G.); Almonte, Marin Co., *Sutcliffe*, May 17, 1919 (Cal. Acad.); Sausalito, *K. Brandegee*, June, 1889 (G.). OREGON: salt marsh on tide-flats, Toledo, Lincoln Co., *J. C. Nelson* 2355, July 5, 1918 (G.); on ballast, Lower Albina, Portland, Multnomah Co., *Sheldon* S.9915, July 21, 1902 (Ore.). CHILE: PROV. ACONCAGUA: Dept. Valparaiso: on shore at port of Valparaiso, *Philippi* 70 (B.); Algarrobo, *Germain*, October, 1836 (Santiago, photo. in G., type of *Arenaria litoralis* Philippi). PROV. SANTIAGO: Dept. Santiago: Santiago, *Claude-Joseph* 2223, December, 1922 (U. S.); Santiago, *Philippi*, 1861 (K.); Careo, Santiago, *E. C. Reed* (K.). Dept. Meli-

<sup>1</sup> Based upon *A. maritima* All. 87 no. 119 (1774) which is the same as *A. maritima* All. Misc. Taur. (see note under discussion of *S. marina*), which is probably based upon *A. rubra*  $\beta$ . *marina* L. (1753) (see discussion under *S. marina*). The name *maritima* has its source in pre-Linnaean works and is in great confusion.



SPERGULARIA: stipule, calyx and capsule  $\times 5$ ; seeds  $\times 25$ .

*S. MEDIA*, figs. 1a-1c. *S. ECHINOSPERMA*, figs. 2a-2c. *S. MARINA*, figs. 3a-3e. *S. CONGESTIFOLIA*, figs. 4a and 4b. *S. ARBUSCULA*, figs. 5a-5e.



Type of *ARENARIA RUBRA* β. *MARINA* L.

Photograph of *Arenaria foliis linearibus longitudine internodiorum* of Linnaeus, Hort. Cliff., by courtesy of Mr. JOHN RAMSBOTTOM.



pilla: San Antonio, *Looser*, 1295, December 23, 1928 (G.); en terrenos arenosos terrosos, secos y asoleados de la orella del mar, Dunas, lado noete, San Antonio, *G. Montero* 232, October 16, 1927 (G.); San Antonio, *Claude-Joseph* 1765, October, 1921 (U. S.). PROV. CONCEPCION: Dept. Concepcion: Concepcion, *Beechey* (K., mounted on sheet of *A. media*); Concepcion, *Jaffuel* 330, January, 1912 (G.); Concepcion, *Claude-Joseph* 4086, November, 1925 (U. S.); Hualpén, *Barros* 267, December 10, 1937 (G.). Dept. Arauco: moist sand behind dunes of beach, *Pennell* 12908, March 6, 1925 (G., F. M.); Arauco, *Barros* 285, November 15, 1938 (G.). PROV. CAUTIN: Dept. Imperial: Saavedra?, *Hollermayer* 203, November, 1919 (B.); Budi, *Claude-Joseph* 3119, January, 1925 (U. S.). PROV. VALDIVIA: Dept. Valdivia: crevices of rocks within tide mark, Bay of Valdivia, *Bridges* 571 (K., mounted on sheet with *A. media*); Valdivia, *Bridges* vel *Cuming?* 256, 1862 (N. Y.); on seacoast at Corral, *Buchtien* 12968, January, 1902 (U. S.); Corral, *Philippi*, 1860 (K.); San Juan, *Gunckel* 1967, February 8, 1931 (G.); San Carlos, *Gunckel* 1988, February 15, 1931 (G.); Amargos, *Gunckel* 15114, February 18, 1930 (G.) and 1871, November 6, 1929 (G.); on the seashore to the north of the sand bar of Rio Bueno, *Hollermayer* 776, January 29, 1935 (G.). PROV. CHILOE: Dept. Ancud: sand flats behind beach, Ancud, *Pennell* 12558, February 6-7, 1925 (G.); muddy tidal flat, salt marsh, Isla de Mechuque, *Pennell* 12624, February 10, 1925 (G.), immature. Dept. Castro: Chiloe and Chonos, *E. C. Reed*, 1871 (G., K.). CHONOS ARCHIPELAGO: Tres Montes, *Darwin* 6, December, 1834 (K.). Without definite locality: *Philippi*, 1870 (B.); *C. Vohsenius*, 1860 (B.); mittleres Chile, *Claude-Joseph* (G.); Herb. *Link* 3, (B., marked *dubium*, *Lepigono marino* affine by *Kindberg*, 1861, type of *L. marinum* subsp. *dubium* Kindb.);<sup>1</sup> *Bridges* (B.). JUAN FERNANDEZ ISLANDS: Masafuera: Quebrada de las Casas, near the sea, *C. & I. Skottsberg* 411, February 24, 1917 (U. S., N. Y., K., seeds small, 0.6-0.7 mm., with elongate mounds but in habit similar to the specimens from the Falkland Islands). FALKLAND ISLANDS: Shallow Bay beach, W. Falkland Islands, *Vallentin*, 1909-1911 (G., K.); Falkland Islands, *Hooker* f., 1839-1843 (G., K.). URUGUAY: Montevideo, *M. Arsène Isabelle*, 1838 (F. M.). ARGENTINA: PROV. BUENOS AIRES: proderas nimedas entre La Plata y Ensenada, *Cabrera* 1768, October 8, 1931 (G.); Buenos Aires, *Tweedie* (K.); Buenos Aires, *Gillies* (K., cited under *A. media* by *Hooker*).<sup>2</sup> Santa Cruz. Terr.: Port Desire, *Darwin* (K., immature).

There is a specimen correctly filed and labeled *media* in the Linnaean Herbarium,<sup>3</sup> which therefore can be designated as the TYPE of *Arenaria*

<sup>1</sup> Mon. Lepig. 21 (1863), also cited under *Spergularia media* by Rohrb. in *Linnaea*, xxxvii. 242 (1871-73).

<sup>2</sup> Bot. Misc. iii. 147 (1832).

<sup>3</sup> Photograph by courtesy of Mr. C. A. Weatherby is in the Gray Herbarium. I am also greatly indebted to Mr. Weatherby for careful measurements of this type.

*media* L. The capsules measure 8–9 mm. long and have smooth, dull, dark brown seeds 0.6–0.8 mm. long, with broad wings 0.3–0.4 mm. wide. With such large capsules the plant could not possibly belong to *S. marina*.

*S. media*, so often confused with *S. marina*, differs from the latter in having larger capsules, usually larger seeds which are nearly always winged, petals white instead of pink or rosy, stamens 9–10 instead of 3–5, and a stouter, more erect, more glabrous habit. *S. media* may be easily distinguished from *S. macrotheca*, which has seeds so like as often to be indistinguishable, by its more glabrous habit, more protruding capsule, less fascicled leaves, deltoid, slightly acuminate stipules instead of lanceolate, strongly acuminate larger ones, white petals, and blunt sepals.

It may be noted in the description that there is great variability in size of seed and width of wing. Most of the Californian plants have large seeds, 1–1.1 mm. long, while Chilean plants usually have small seeds, 0.7–0.9 mm. long, though occasionally as large as 1 mm. Those of New York plants measure 0.8–0.9 mm. Since European plants have all these sizes of seeds, this variability is not significant. New York seeds have broad wings, 0.3–0.4 mm. wide, and Chilean seeds have wings 0.2–0.3 mm. wide or none at all. Californian, Argentinian and European seeds show all widths of wings. There are all variations in length of capsule in relation to length of calyx in all parts of the range, including Europe. There are also all types of habit throughout the range from very short, compact plants with fleshy leaves to large, heavy, long-stemmed plants, probably depending upon the ecological conditions of the habitat. A detailed study of more complete collections of European plants may throw some light upon these variations and bring out sound taxonomic differences, especially in size and length of capsule in relation to the calyx, type of wing and size of seed.

The Chilean plants often show low, elongate mounds upon the surface of the seed, unlike any European seeds I have been able to examine. However, at present I can find no other character to support a separation of Chilean plants. I admit that this plant seems common and widespread enough in Chile possibly to be native there. The Juan Fernandez material is not typical but its habit compares well with that from the Falkland Islands, which has typical seeds. Juan Fernandez seeds are small, 0.6–0.7 mm. long, with low, elongate

swellings and very delicate, vermiform tracteries on the seed-coat. These seeds agree well with those of many Chilean specimens but are a bit smaller.

*S. alata*, according to Wiegand, differs from *S. marginata*, which is synonymous with *S. media*, in having more glabrous stems, more foliaceous bracts, and a more erose wing to the seed. Many European collections of *S. media*, however, are entirely glabrous and most have bracts as long as, or longer than, the type of *S. alata*. Except for the wide erose wing, this latter plant agrees in every way with many widely distributed collections of *S. media* from all parts of Europe. This type of wing, furthermore, is found in a few European plants and in some Californian collections.

12. *S. MARINA* (L.) Griseb. (PLATE 590, FIGS. 3a-3e, PLATES 591 and 592 and MAPS 7 and 8). Annual with 1- $\infty$  diffuse stems from the base 5-35 cm. long: internodes below the inflorescence 4-30 mm. long, 0.6-2 mm. thick: leaves not fascicled or with 1 or 2 leaves in the axils, glabrous or glandular-pubescent, 5-40 mm. long, 0.6-1.5 mm. wide, bluntly mucronate; stipules deltoid, about as long as or sometimes a little longer than broad, 2-4 mm., usually 2.5-3 mm., long, apex not acuminate or only slightly so: inflorescence a lax cyme, sometimes very long, sometimes short; internodes glandular-pubescent or less often glabrous, the lowest 5-20 cm. long, 0.4-0.8 mm. thick: bracts foliaceous, the uppermost usually becoming minute, 3 mm. or less in length, or sometimes as much as 4-7 mm.<sup>1</sup>: sepals ovate, blunt-tipped, glabrous or glandular-pubescent, 2.4-5 mm. long; petals ovate, white, pink, or rosy, but often, when colored, white at the base, 1.6-4 mm. long, as much as 1-1.6 mm. shorter than the calyx; stamens 2-5; styles 3, separated to base, 0.4-0.6 mm. long: mature capsules 3.6-6.4 mm. long, equal to or as much as 2.2 mm. longer than the calyx: fruiting pedicels filiform, usually glandular-pubescent, sometimes glabrous, reflexed or not, the lowest 1-10 mm. long: seeds light brown to deep reddish-brown, dull, smooth or slightly roughened by raised thickened places, but with no sculpture, glandular-papillate or not, papillae slender and small to thick and large, dark brown to white, all having dark brown, hard bases, seeds usually 0.6-0.8 mm. long, only in rare cases as small as 0.5 or as large as 0.9 mm., usually not winged though occasionally with a white, usually erose wing which may be as broad as 0.4 mm.—Spicil. Fl. Rumel. et Bith. i. 213 (1843); Rohrb. in Mart. Fl. Bras. xiv. pt. ii. 273 (1872), for the most part; Willk. & Lange, Fl. Hisp. iii. 165 (1880); Robins. & Fernald in Gray, Man. ed. 7, 378 (1908); J. K. Henry, Fl. So. Br. Columb. & Vanc. Is. 118 (1915), plants very likely *S. canadensis* var. *occidentalis*. *Arenaria rubra*  $\beta$ . *marina* L. Sp. Pl. i. 423 (1753);<sup>2</sup> also ed. 2; Torrey, Fl. N. & Mid. U. S. 456 (1824).

<sup>1</sup> See the discussion.

<sup>2</sup> Phrase-description is "*Arenaria foliis linearibus longitudine intermediorum.*"



*A. rubra* β. L. Fl. Succ. ed. ii. 152 (1755).<sup>1</sup> *A. marina*<sup>2</sup> Allioni, Fl. Pedem. ii. 114 (1785); Roth, Fl. Germ. i. 189 (1788). *A. marina* (L.) Smith, Fl. Brit. ii. 480 (1800) and Eng. Bot. xiv. 958 & fig. (1802), probably a mixture of *S. marina* and *S. media*, the figure surely depicting *S. media*; Bigelow, Fl. Bost. ed. 3, 191 (1840), for the most part, excluding the synonym *Arenaria canadensis* Pers. *Stipularia marina* (L.) Haworth, Syn. Pl. Succ. 104 (1812). *Spergularia salina* J. & C. Presl, Fl. Cechica, 95 (1819); Gray, Man. ed. 5, 95 (1867); Robins. in Proc. Am. Acad. xxix. 311 (1894) and in Gray, Synop. Fl. i. 251 (1897); Chapman, Fl. So. U. S. ed. 3, 44 (1897); Fernald & Wiegand in RHODORA, xii. 162 (1910); Jepson, Fl. Calif. pt. v. 494 (1914) and Man. Fl. Pl. Calif. 360 (1923); Rydberg, Fl. Prair. & Plains, 322 (1932); Munz, Fl. So. Calif. 164 (1935); Macbride, Field Mus. Pub. Bot. xiii.—Fl. Peru pt. 2, no. 2, 632 (1937). *Lepigonum marinum* Wahlb. Fl. Gothob. 47 (1820), not as to plants discussed and references given which deal with *S. media*;<sup>3</sup> Kindberg, Synop. Lepig. 12 (1856), not as to description and literature cited which deal with *S. media*.<sup>3</sup> *L. marinum* (L.) Kindb. Mon. Lepig. 18, t. i, fig. 6 (1863), as to source of name but not as to description, excluding references, Griseb. and DC., all of which are *S. media*, and excluding *S. macrocarpa* and *S. rupestris*. *L. medium* sensu Wahlb. Fl. Gothob. 46 (1820), Linnaean authority for *media* not given but *A. rubra* ζ. *marina* L. given as a synonym, non *Arenaria media* L. (1762); sensu Koch, Syn. Fl. Germ. & Helv. ed. 2, i. 121 (1843), following Wahlb., non *Arenaria media* L. (1762). *L. medium* sensu Kindb. Synop. Lepig. 14 (1856), in part, at least as to the North American plants cited<sup>4</sup> and probably as to description, non *Arenaria media* L. (1762); sensu Kindb. Mon. Lepig. 24, t. ii, fig. 11 (1863), same treatment as in the Synop. Lepig., non *Arenaria media* L. (1762); sensu Wats. Smiths. Misc. Coll. no. 258 (Bibl. Index) 103 (1878), in small part, including those synonyms belonging with *S. marina*,<sup>5</sup> non *Arenaria media* L. (1762); sensu Brewer & Watson, Geol. Survey of California, Bot. i. 71 (1880), at least for the most part, non *Arenaria media* L. (1762). *Arenaria salina* (Presl) Seringe in DC. Prod. i. 401 (1824). *Spergula marina* Bartl. & Wendl. f. Beitr. Bot. ii. 64 (1825), probably as to plant but the authors refer to DC. "exclud. syn. Linn." *Alsine marina* (L.) Mert. & Koch in Roehl. Deutsch Fl. ii. 293 (1826);

<sup>1</sup> The same as Fl. Succ. ed. i. (1745). Phrase-description is "*Arenaria foliis linearibus longitudine internodiorum*" in both editions.

<sup>2</sup> No actual authority given for using *marina* but the Linnaean phrase for β. *marina* is used as a synonym; see discussion.

<sup>3</sup> Wahlberg here completely reverses the two Linnaean entities and is followed later by Kindberg in his Synopsis and also by Koch.

<sup>4</sup> *S. media* was probably not introduced or at least was not common in eastern North America at that time though I have seen none of the actual specimens cited. Also the capsule is said to be small which is not characteristic of *S. media*. Kindberg treats the large-capsuled *S. media* under *Lepigonum marinum* in the same work.

<sup>5</sup> Watson's treatment deals only with literature and includes synonyms belonging with many species, e. g. *S. marina*, *S. media* and *S. canadensis*.

Reichenb. Fl. Germ. 566 (1832); Webb & Berth. Phyt. Canar. i. 147 (1840), at least as to source of name but including many species such as *S. media*, *S. villosa*, etc. *Alsinella media* sensu Hornem. Nom. 32 (1827), who gives *Arenaria rubra marina* L. as the only synonym, non *Arenaria media* L. (1762). *Buda marina* (L.) Dumort. Fl. Belg. 110 (1827); Wats. & Coult. in Gray, Man. ed. 6, 89 (1889); Kuntze, Rev. Gen. iii, pt. 2, 13 (1898), at least as to source of name (*Moreno & Tonini* 343 is *S. ramosa*, and the synonyms *A. media* L. and *B. media* Dumort. belong with *S. media*); Macloskie, Report Princeton Univ. Exp. Patagonia, viii. i. pt. 5. 395 (1905), probably *S. media* as to plants. *Spergularia canadensis* sensu G. Don, Gen. Hist. Dichl. Pl. i. 426 (1831), in part, as to plants discussed because "plant pilose, rather hispid" and the southern part of range "Carolina" could apply only to *S. marina*, non *Arenaria canadensis* Pers. (1805). *Spergula rubra* β. Torr. & Gray, Fl. N. A. i. 175 (1838) (reference is made to *A. rubra* var. *marina* L.). *Lepigonum salinum* (Presl) Fries, Nov. Fl. Suec. Mant. 3, 34 (1839); Kindb. Synop. Lepig. 10 (1856); Kindb. Mon. Lepig. 36, t. iii, fig. 27 (1863), good figure and description; Smith, Eng. Bot. Suppl. v. 2978 (1864); Wats. in Smithson. Misc. Coll. no. 258 (Bibl. Index) 104 (1878). *Spergula salina* (Presl) D. Dietr. Syn. Pl. ii. 1598 (1840). *Alsine marina* α *minor* Heynh. Nom. 38 (1840), who gives *S. salina* Presl as synonymous. *Alsine heterosperma* Guss. Fl. Sic. i. 501 (1842) (gives *A. rubra* β. *marina* L. as a synonym). *Spergularia rubra* var. *marina* Gray, Man. 64 (1848), gives Linnaean authority for *rubra* but none for *marina*.<sup>1</sup> *Spergularia rubra* var. *marina* (L.) Gray, Man. ed. 2, 62 (1856), also Rev. Ed. and ed. 4, in part or possibly all as to plants discussed,<sup>1</sup> excluding the synonym *A. media* L. *Lepigonum neglectum* Kindb. Synop. Lepig. 6 (1856).<sup>2</sup> *L. salinum* \* *Lepigonum canadense*<sup>3</sup> Kindb. Synop. Lepig. 11 (1856), as to plants described, probably. *L. leiospermum* Kindb. Mon. Lepig. 23, t. ii, fig. 10 (1863), excluding the synonyms *A. canadensis* Pers. and *A. media* Hooker f. and also the Falkland Island collection which is *S. media*. *L. rupestre* sensu Kindb. Mon. Lepig. 29, t. ii, fig. 13 (1863), in small part, including only the Montevideo (*Sello*) collections (see citations), excluding synonymy, citations, figure, and description, all of which apply to *S. rupicola* Lebel, non *Spergularia rupestris* Lebel (1848). *Spergula rubra* sensu Darby, Bot. So. States, 244 (1866) (*S. marina* because the stipules are described as ovate and plants as growing in salt marshes), non *Arenaria rubra* L. (1753). *Spergularia media* sensu Gray, Man. ed. 5. 95 (1867),

<sup>1</sup> Gray probably includes *S. canadensis* with *marina* because he says it is common on the seacoast and treats no other species besides *S. rubra*.

<sup>2</sup> Proved to be a synonym of *S. marina* because Kindberg, Mon. Lepig. 37 (1863), places *L. neglectum* as a synonym of *L. salinum* (Presl) Fries.

<sup>3</sup> Placed as a subordinate entity under *Lepigonum salinum*, obviously not in specific rank. Kindberg gives *Lepigonum canadense* Fisch. & Mey. Ind. Sem. Hort. Petrop. iii. 14 (1837), which is a *nomen nudum*, as to name and in no way refers to *Arenaria canadensis* Pers. (1805).

excluding reference *L. medium* Fries, non *Arenaria media* L. (1762); sensu Watson, Rep. King Exp. v. Bot. 42 (1871) (collection cited, Watson 177, is *S. marina*), non *Arenaria media* L. (1762). *S. miquelonensis* Lebel in Bull. Soc. Bot. France, xv. 58 (1868), *nomen nudum*.<sup>1</sup> *Spergula leioperma* (Kindb.) F. Schmidt, Reisen Amurl. 131 (1868). *Spergularia heteroperma* (Guss.) Lebel, Mem. Soc. Sc. Nat. Cherb. xiv. 45 (1869); Heldr. ex Nym. Conspect. 122 (1878-1882). *S. neglecta* Syme, Engl. Bot. ed. 3, ii. 129, t. 255 (1873). *S. rubra* sensu Chapman, Fl. So. U. S. ed. 2, 48 (1884), non *Arenaria rubra* L. (1753). *Tissa marina* (L.) Britton in Bull. Torr. Bot. Club, xvi. 126 (1889); Greene, Fl. Francisc. 128 (1891), as to source of name but not as to description, because he states that the capsule is twice the length of the calyx and because he applies the name *T. salina* to what should be *S. marina* (Greene was probably describing *S. media*); Greene, Man. Bot. San Francisc. Bay 37 (1894), not as to description for same reasons as above; Britt. & Brown, Ill. Fl. U. S. ii. 37, fig. 1514 (1897); Small, Fl. Se. U. S. 418 (1903); Piper, Contrib. U. S. Nat. Herb. xi. (Fl. State Wash.) 263 (1906) (most and probably all the plants cited are *S. canadensis* var. *occidentalis*); Piper & Beattie, Fl. Nw. Coast, 145 (1915); Small, Man. Se. Fl. 502 (1933). *Tissa salina* (Presl) Britt. in Bull. Torr. Bot. Club, xvi. 127 (1889), as to source of name but not as to description which is that of *S. canadensis*; Greene, Fl. Francisc. 128 (1891) and Man. Bot. San Francisc. Bay, 37 (1894); Jepson, Fl. W. Mid. Calif. 170 (1901); Howell, Fl. Nw. Coast, 88 (1903); Heller, Muhlenbergia, vi. 96 (1910); Rydb. Fl. Rocky Mts. ed. 1, 279 (1917), also ed. 2; Tidestrom, Contrib. U. S. Nat. Herb. xxv. (Fl. Utah & Nevada) 197 (1925). *Tissa tenuis* sensu Greene in Bull. Torr. Bot. Club, xvi. 128 (1889), including collections *Rothrock* 154 and *Santa Monica*, *J. C. Nevin*, and excluding *Alameda*, *Greene* collection, which is *S. marina* var. *tenuis*, non *Lepigonum tenue* Greene (1887). *T. diandra* sensu Brandegees, Proc. Calif. Acad. Ser. 2, ii. 131 (1889), because collection cited is of *S. marina*, non *Arenaria diandra* Guss. (1827). *Buda marina* (?) var. *minor* Wat. & Coult. in Gray, Man. ed. 6, 90 (1889).<sup>2</sup> *Buda marina* var. *leioperma* N. E. Brown apud Wats. & Coult. in Gray, Man. ed. 6, 90 (1889).<sup>3</sup> *Corion marinum* (L.) N. E. Brown in Syme, Engl. Bot. ed. 3, Suppl. 48 (1891). *Corion marinum* var. *leioperma* (Kindb.) N. E. Brown<sup>2</sup> in Syme, Eng. Bot. ed. 3, Suppl. 48 (1891). *Tissa salina* var. *sordida* Greene, Fl.

<sup>1</sup> Lebel's combination is based upon an herbarium name, *Arenaria miclonensis* LaPylaie (B.), whose specimen is *S. marina*. Also, Kindberg mentioned this latter name among the "nomina inedita" omitted from the synonymy of his *L. salinum*, Mon. Lepig. 37 (note) (1863).

<sup>2</sup> I have never been able to find the Star Island plant collected by Sereno Watson, but I believe that it would be a puny specimen of *S. marina*.

<sup>3</sup> N. E. Brown sent a proof to the Gray Herbarium in which was a description of *Buda marina* var. *leioperma*. Watson published this in 1889, with no reference to Kindberg, before N. E. Brown's work actually was completed. Brown finally published it as *Corion* (instead of *Buda marinum* var. *leioperma* in 1891).



Francisc. 129 (1891) and Man. Bot. San Francisc. Bay 37 (1894). *T. salina* var. *Sanfordii* Greene, Fl. Francisc. 129 (1891) and Man. Bot. San Francisc. Bay 37 (1894). *Spergularia salina* var. ? *minor* Robins. in Proc. Am. Acad. xxix. 312 (1894) and in Gray, Synop. Fl. i. 252 (1897). *Tissa sparsiflora* Greene in Erythea, iii. 46 (1895); Rydberg, Fl. Rocky Mts. ed. 1, 279 (1917), also ed. 2. *Spergularia salina* var. *leiosperma* (Kindb.) Gürke, Pl. Eur. ii. 196 (1897). *Tissa diandra bracteata* sensu Piper, Contrib. U. S. Nat. Herb. xi. (Fl. State Wash.) 264 (1906), in part, including only the collection, Sandberg and Leiberger 346, non *Spergularia salsuginea* var. *bracteata* Robins. (1897). *Spergularia sparsiflora* (Greene) A. Nels. in Coulter & Nels. New Man. Centr. Rocky Mts. 187 (1909). *S. leiosperma* (Kindb.) Fernald & Wiegand in RHODORA xii. 162 (1910). *Tissa leiosperma* (Kindb.) Heller, Muhlenbergia, vi. 84 (1910). *Spergularia salina* var. *sordida* (Greene) Jepson, Fl. Calif. 494 (1914) and Man. Fl. Pl. Calif. 360 (1923). *Alsine sparsiflora* (Greene) House in Am. Midl. Nat. vii. 134 (1921). *A. maritima* House in Am. Midl. Nat. vii. 133 (1921).<sup>1</sup>—NORTH AMERICA and SOUTH AMERICA (where it is probably introduced); common along temperate seashores of the Atlantic coast from Quebec to Florida and of the Pacific coast from British Columbia to Lower California and in alkaline places in the interior of the continent.

The following citations are of plants with papillose seeds (see MAP 7).

QUEBEC: brackish marshes, Cacouna, Temiscouata Co., Fernald, August 8, 1902 (G., B.); salt marsh, Bic, River St. Lawrence, Rimouski Co., Fernald & Collins 1031, July 25 and 26, 1907 (G., U. S.). PRINCE EDWARD ISLAND: damp brackish sand, Alberton, Prince Co., Fernald & St. John 7435, July 11, 1912 (G., U. S., Can., inflorescence leafy). NEW BRUNSWICK: "La Prée," Memramcook, Westmoreland Co., Victorin, August 21, 1919 (G., U. S.); salt marsh 4 miles ne. of Sussex, Kings Co., Svenson & Fassett 1095, August 22, 1923 (G.); dry headlands, Grande Anse, Gloucester Co., Blake 5527, August 22, 1913 (G.), very small seeds 0.5–0.6 mm. long. NOVA SCOTIA: salt marsh at head of Baddeck Bay, Victoria Co., Fernald & Long 21183, August 27, 1920 (G., U. S.); red sandstone alluvium near the brackish mouth of Salmon River, Truro, Colchester Co., Fernald & Wiegand 3327, September 11, 1910 (G.). MAINE: old wharf, Pembroke, Washington Co., Fernald 1761, July 29, 1909 (G.); site of old pickle factory, North Berwick, York Co., Fernald, September 26, 1897 (G., N. E. B. C.). NEW HAMPSHIRE: Seabrook, Rockingham Co., A. A. Eaton, July 6, 1903 (G.). MASSACHUSETTS: Revere, Suffolk Co., C. E. Faxon (G.); salt marsh bordering Bass River, Yarmouth, Barnstable Co., Fernald & Long, Plant. Exsicc. Gray. 357, August 16,

<sup>1</sup>House bases this combination upon *Arenaria maritima* Pallas, Reise iii. 603 (1772–73), which is a *nomen nudum* and cited by index Kewensis as *Arenaria marina* Pallas.

1919 (G., D. S., U. C., Pom., inflorescence leafy). RHODE ISLAND: Wickford, *Kennedy*, June 17, 1908 (G.). CONNECTICUT: Groton, *Jansson*, August 3, 1927 (W.). NEW YORK: Northbeach, Long Island, *Heuser*, June 22, 1895 (B.); saline clay about the salt sheds, south of Liverpool, Syracuse, Onondaga Co., *Fernald, Wiegand & Eames* 14277, August 31, 1922 (G.). NEW JERSEY: Weehawken, Hudson Co., *Van Sickle*, July 12, 1893 (U. S., inflorescence leafy); brackish marsh, e. of Sea Breeze, Cumberland Co., *Fogg* 8798, June 21, 1935 (Penn.). DELAWARE: tidal mud, Bakeoven Point, Kent Co., *Larsen* 963, July 8, 1935 (Penn.); marshy land, 2 miles nw. of Woodland Beach, Kent Co., *Larsen* 532, June 21, 1934 (Penn.). MARYLAND: Chesapeake Beach, Calvert Co., *House* 1453, August 20, 1905 (U. S.). VIRGINIA: sand at upper border of salt marsh, Wachapreague, Accomac Co., *Fernald & Long* 3926, July 26, 1934 (G.); shell heap, edge of tidal marsh, York River, n. of Williamsburg, James City Co., *Grimes* 4012, July 15, 1921 (G.); Virginia, *Clayton* 475, British Museum—photo. in G., our PLATE 592—marked "*Arenaria foliis linearibus longitudine internodiorum*. Hort. Cliff. p. 173", cited by Linnaeus, Sp. Pl. i. 423 (1753). NORTH CAROLINA: Acracoke Island, Hyde Co., *Kearney* 2302, October 13, 1898 (U. S.). FLORIDA: shore of St. John's River, Duval Co., *Fredholm* 5311, June 14, 1902 (U. S., seeds unusually small, 0.5–0.6 mm. long); low places subject to tidal inundation, North Beach, St. Augustine, St. John Co., *Donnell Smith*, March 21, 1884 (U. S., very small, nearly smooth seeds 0.5–0.6 mm. long). BERMUDA: Spittal Pond, *R. B. Kennedy* 171, April 5, 1929 (G.); salt marsh near Spittal Pond, *Stewardson Brown* 591, February 10–March 9, 1908 (G.). ILLINOIS: waste ground in city of Chicago, Cook Co., *Moffat* 283, August 12, 1893 (W.). ATHABASCA: Mackenzie Basin: near Heart (Raup) Lake, Wood Buffalo Park, about 59° 41' N., 111° 56' W., prairie along small salt creek, *Raup* 2343, August 20, 1928 (Can.) and salt plain, 2342, August 19, 1928 (Can.); Little Buffalo River, Wood Buffalo Park, *Russell*, July 31, 1926 (Can.). IDAHO: Alpine Hot Springs, Bonneville Co. (on the Snake River, near the Wyoming Boundary), *Payson & Armstrong* 3432, July 9, 1923 (G., Pom., inflorescence leafy). TEXAS: Sabine Pass, Jefferson Co., *Reverchon* 3694, April 25, 1903 (G., U. S.). NEW MEXICO: Bernalillo, Sandoval Co., 1555 m., *Arsène & Benedict* 15653, July 12, 1926 (U. S.). BAJA CALIFORNIA: springy slope, trail to cypress grove, Guadalupe Island, *J. T. Howell* 8287, March 17, 1932 (Cal. Acad., U. C., D. S.); Poso Grande, Southern District, *Brandegge*, March, 1889 (G.); San Carlos, Northern District, *Eastwood* 12409, September 10, 1923 (Cal. Acad.). CALIFORNIA: near R. R. track, Linda Vista, San Diego Co., *Macbride & Payson* 783, July 6, 1915 (G.); waste water sink, West Riverside, Riverside Co., *F. M. Reed* 1131, July 8, 1906 (U. S., D. S.); ½ mile s. of Lake Elsinore, desiccating mud-flat, Riverside Co., *Munz* 5074, April 29, 1922 (Pom.); stream-bank, Aliso Canyon, Laguna Beach region, Orange Co., *D. L. Crawford*, July 26, 1916 (Pom.); Montebello,

Los Angeles Co., *Cecil Hart*, March 22, 1927 (Cal. Acad.); border of rainpool on alkaline flats 5.5 mi. north of Lancaster, Mojave Desert, Los Angeles Co., *J. T. Howell* 4896, May 12, 1930 (Cal. Acad.); coast highway near Pt. Mugu, Ventura Co., *Abrams* 13691, June 26, 1935 (D. S., both smooth- and papillose-seeded plants on same sheet); along beach, Ventura, Ventura Co., *Eastwood* 5026, April 17, 1916 (Cal. Acad.); sandy flat on shore, Dix Cañon, Santa Cruz Island, Santa Barbara Co., *Clokey* 5150, May 26, 1930 (G.); La Graciosa, Santa Barbara Co., *Eastwood* 858, July 2, 1906 (G.); Santa Barbara, *Rothrock* 154, July, 1875 (G.); Piedras Blancas, San Luis Obispo Co., *Eastwood & Howell* 5987, June 15, 1938 (Cal. Acad.); Hollister, San Benito Co., *Setchell*, April 14, 1897 (U. C.); near Hollister, San Benito Co., *Eastwood & Howell* 4298, May 4, 1937 (Cal. Acad.); colonies in low alkaline spots, Searsville, San Mateo Co., *C. F. Baker* 1859, October 20, 1920 (G., U. S., Cal. Acad., U. C., Pom., determined as *Tissa sordida* by E. L. Greene); near Alameda, Alameda Co., *Greene*, July 31, 1887 (G., specimen only fragmentary but characteristic of *S. marina*, marked *T. sordida* Greene); at Alameda, Alameda Co., *Greene*, July 21, 1887 (U. C.); eastern Livermore Valley, Alameda Co., *J. T. Howell* 13742, April 10, 1938 (Cal. Acad.); colonies occasional on the alkaline plains, Byron, Contra Costa Co., *C. F. Baker* 2865, April 27, 1903 (G., U. S., Notre Dame, U. C., Pom., determined as *Tissa Sanfordii* by E. L. Greene); wet soil of low field at Holt, San Joaquin Co., *J. T. Howell* 10792, September 2, 1932 (Pom.); Calistoga Hot Springs, Napa Valley, *J. P. Tracy* 1858, May 18, 1903 (U. C.); growing alone on muddy banks, Drake's Estero, 8 miles west of Inverness, Marin Co., *G. B. & R. P. Rossbach* 629, May 26, 1938 (G., D. S.); salt marsh at base of sand dunes, Bodega Bay, Sonoma Co., *G. B. & R. P. Rossbach* 630, May 27, 1938 (G., D. S.); 12 miles n. of Dixon, Yolo Co., *Doris K. Kildale* 5033, May 8, 1928 (D. S.); gray clay, alkaline soil, near Colusa, in the valley oak belt, Colusa Co., *Heller* 13541, April 10, 1921 (U. S., D. S.); in wet irrigation ditch, 3 miles e. of Williams, Colusa Co., *G. B. & R. P. Rossbach* 632, May 21, 1938 (G., D. S.). OREGON: on ballast, Lower Albina, Portland, Multnomah Co., *Sheldon* S.9909, July 20, 1902 (Ore.). WASHINGTON: salt marsh, Port Hadlock, Jefferson Co., *G. N. Jones* 3100, June, 1931 (W.). BRAZIL: in den Salinen bei lago Friv. (Lake Feia?), Rio de Janeiro, *Ule* 4699, October 19, 1899 [B.]; *Sello* d2381 (d2167-2438 ebenda S. Francisco do Paula und Villa Rio Grande do Sul, October, November, 1824)<sup>1</sup> (B., one sheet marked *Lepigonum neglectum* Kindb. 1861).<sup>2</sup> Port Alegre, Prov. Rio Grande do Sul, *Tweddle* (K.). Brazil, no locality: *Sello*, (Leiden). URUGUAY: Montevideo, *Sello* d208 (B., 4 sheets, one marked "*Spergularia salina* Presl quoad planta Selloana det. P. Rohrbach" and *Lepigonum rupestre* (Lebel) Kindb. 1861. Montevideo, *Sello* d207 (B., marked *Lepigonum neglectum*

<sup>1</sup> Urban in Engler, Bot. Jahr. xvii. 196 (1893).

<sup>2</sup> Cited by Kindb. under *L. salinum*, Mon. Lepig. 38 (1863).



Kindb. 1861);<sup>1</sup> Montevideo, *Gibert* 170, 989 (K.); in dry sand, Curarein, Berro 2556, September 24, 1902 (K.); Pocitos-Malvin, Montevideo, *Herter* 76201, November, 1924 (B.). ARGENTINA: PROV. BUENOS AIRES: in suelo anegadiso cerca del rio de la Plata, Isla Mariel, *Burkart* 3044, December 6, 1928 (B.); wet saline places, Bañado de Flores, Buenos Aires, *Parodi* 5934, November 16, 1924 (B.). PROV. JUJUY: El Volcan, *Hieronymus & Lorentz* 731 & 735, May 12 and 13, 1873 (B.). PROV. SANTA CRUZ: Puerto San Julian, *M. E. Blake* 192, April, 1933 (K.).

The following citations are of plants with smooth seeds (see MAP 8).

ILE MIQUELON: maritime shores, bord du Grand Étang, *Arsène* 253, August 16, 1900 (G.). QUEBEC: damp hollows, gravelly beach, Carleton Point, Carleton, Bonaventure Co., *Collins & Fernald*, July 21, 1904 (G.). MAGDALEN ISLANDS: damp, brackish, sandy beach, Grande Entrée, Coffin Island, *Fernald, Long & St. John* 7427, August 19, 1912 (G., U. S., Can., U. C.). PRINCE EDWARD ISLAND: border of salt marsh, Bunbury, Queens Co., *Fernald, Long & St. John* 7426, August 28, 1912 (G., Can.). NEW BRUNSWICK: shore, Shippigan, Lameque, Gloucester Co., *Blake* 5538A, August 26, 1913 (G.); marsh, Richibucto, Kent Co., *Blake* 5712, September 22, 1913 (G.); St. Andrews, Charlotte Co., *Fowler*, July 28, 1900 (U. S.). NOVA SCOTIA: brackish beach of Wallace Lake, Sable Island, *H. St. John* 1222, August 14, 1913 (G., Can., U. S.); brackish gravelly beach by Baddeck Bay, Baddeck, Victoria Co., *Fernald & Long* 21187, August 27, 1920 (G., Can.); upper border of gravelly strand, Villagedale, Shelburne Co., *Fernald, Long & Linder* 21184, August, 1920 (G., Can.); waste places and roadsides, Windsor, Hants Co., *Fernald, Bartram & Long* 23831, July 25, 1921 (G., Can.). MAINE: dryish strand, eastern side of Moose Island, Passamaquoddy Bay, Washington Co., *Fernald* 2216, August 16, 1909 (G., Cal. Acad.); shores of Pool, Great Cranberry Isle, Hancock Co., *Rand & Redfield*, August 30, 1892 (Penn.); on small barrier beach sw. shore of Warren Island, Islesboro, Waldo Co., *R. P. & G. B. Rossbach*, September 4, 1935 (G.). NEW HAMPSHIRE: Star Island, Isles of Shoals, Rockingham Co., *E. F. Williams*, September 19, 1901 (G.); Little Harbor, Rye, Rockingham Co., *E. F. Williams*, September 19, 1901 (G.). MASSACHUSETTS: salt marsh, Newbury, Essex Co., *E. F. Williams*, July 31, 1898 (G.); Woods Hole, Barnstable Co., *Pennell* 3338, July 26, 1911 (Penn.). RHODE ISLAND: salt marshes about Harbor Pond and Tim's Pond, Block Island, Newport Co., *Fernald & Long* 9477, August 19, 1913 (G.). CONNECTICUT: sandy bank of Housatonic River, Milford, New Haven Co., *E. H. Eames*, August 15, 1895 (U. S.); brackish shore, flowers white, Norwalk, Fairfield Co., *E. H. Eames* 9732, July 24, 1921 (G.). NEW YORK: sandy beach, Fisher's Island, Suffolk Co., *H. St. John* 2719, August 10-15, 1920 (G.); salt marshes, Wading River

<sup>1</sup> Cited by Kindb. under *L. rupestre*, Mon. Lepig. 29 (1863).

Northville, Suffolk Co., Long Island, *H. W. Young*, August 12, 1873 (U. S.). NEW JERSEY: sand over brackish marsh, Brigantine Beach, Atlantic Co., *Fogg* 9544, August 26, 1935 (Penn.); brackish marsh near West Creek, se. of Delmont, Cumberland Co., *Fogg* 5619, June 22, 1933 (Penn., two sheets very different in habit); Port Norris, *J. H. Holmes*, September, 1898 (Pom.). DELAWARE: sandy beach, 1 mile so. of Bower's Beach, Kent Co., *Larsen* 918, July 24, 1935 (Penn., bracts of inflorescence very small). CAROLINA: no definite locality, ad littora maris, *Beyrich* (B., marked *L. leiospermum* Kindb. 1861).<sup>1</sup> ALABAMA: ballast banks, Mobile River, *Mohr*, May, 1883 (U. S.). NORTH DAKOTA: w. of Cushion Slough, Kenmore, Ward Co., *F. P. Metcalf* 583, October 3, 1917 (U. S.); Eckelson Lake, Sanborn, Barnes Co., *D. C. Mabbott* 291, August 8, 1917 (U. S.). TEXAS: Virginia Point, *W. L. Bray* 35, April 15, 1899 (U. S.); near San Elizario (fide added note on U. S. sheet), El Paso Co., *C. Wright* 1324, 1852 (G., U. S.). ALBERTA: garden patch, Garden Plains, Red Deer Co., *Brinkman* 2767, June 29, 1927 (U. S.). SASKATCHEWAN: 15 miles w. of Saskatoon, Saskatoon Co., *Macoun & Herriot* 70906, July 29, 1906 (G., Can., Pom.); Saskatchewan Plains, *Macoun*, Bot. Railr. Surv. 287, August 19, 1872 (G.); salt marshes west of Long Lake, *Macoun* 2674, July 10, 1879 (Can.). MONTANA: dried encrusted shore of an alkaline lake, Lake Bowdoin, e. of Malta, Phillips Co., *G. B. & R. P. Rossbach* 308, July 6, 1936 (G., D. S., U. S.). WYOMING: Laramie, Albany Co., *A. Nelson* 1868, September 3, 1895 (G., U. S., U. C., Pom.); Seven Mile Lake, Albany Co., *A. Nelson* 1158, October 15, 1894 (G., U. S., Notre Dame, type collection of *Tissa sparsiflora* Greene). COLORADO: New Windsor, Weld Co., *Osterhout* 2347, August 8, 1901 (U. S., U. C.), July, 1896 (G.), September 19, 1900 (Pom.), July 7, 1907 (D. S.). UTAH: 6000 ft. alt., Wahsatch, *Watson* (King Exped.) 177, 1869 (U. S., G.); in wet places, Kelton, Box Elder Co., *Garrett* 5414, August 15, 1929 (D. S.); alt. 4300 ft., Salt Lake City, Salt Lake Co., *M. E. Jones* 1088, July 26, 1879 (B., U. S., U. C., Pom.). NEVADA: se. of Reno, Washoe Co., *F. H. Hillman* July 20, 1894 (Pom.); caked alkali ground, St. Thomas, Muddy R., Clark Co., *Goodding* 696, May 3, 1902 (G., U. S.). ARIZONA: Tucson, Pima Co., *Toumey*, May 30, 1894 (N. Y., U. C.); Sacaton, Pinal Co., *Peebles* 1265, March 23, 1926 (U. S.); Agua Caliente, Maricopa Co., *J. I. Carlson*, March 19, 1914 (Cal. Acad.). NEW MEXICO: Albuquerque, Sandoval Co., *M. E. Jones*, July, 1884 (Pom.). LOWER CALIFORNIA: San Vincente, Northern District, *Brandegge*, June 1, 1893 (U. C.). CALIFORNIA: Carisso Creek (this creek just sw. of the Salton Sea in both San Diego and Imperial Cos.) Colorado Desert, *Brandegge*, March 26, 1901 (U. C.); semi-alkaline spot, Garlic Springs, Mohave Desert, San Bernardino Co., *Munz & Keck* 7935, April 10, 1924 (G., Pom.); dry mud flat, s. of Lake Elsinore, Riverside Co., *Munz* 5070, April 29, 1922 (Pom.); Balboa, Orange Co., *Abrams* 6565,

<sup>1</sup> Cited under *Lepigonum leiospermum* Kindb. Mon. Lepig. 24 (1863).

June 23, 1917 (D. S.); low brackish flat near coast, Redondo, Los Angeles Co., *Braunton* 308, May 25, 1902 (U. S., D. S.); Santa Monica, Los Angeles Co., *J. C. Nevin* 647, 1881 (G.,<sup>1</sup> D. S.);<sup>2</sup> coast highway near Pt. Mugu, Ventura Co., *Abrams* 13691, June 26, 1935 (Pom., one plant with papillose seeds and two with smooth seeds; see also citation under papillose seeds); Santa Barbara, Santa Barbara Co., *Rothrock* 154, July, 1875 (G.);<sup>1</sup> margin of Soda Lake, Carisso Plain, San Luis Obispo Co., *Ferris & Rossbach* 9467, May 12, 1938 (G., D. S.); alkaline flats  $\frac{1}{2}$  mile from Earlimart, near U. S. Highway no. 99, Tulare Co., *Ferris & Rossbach* 9669, May 21, 1938 (D. S.); Mercey Hot Springs, Fresno Co., *Eastwood & Howell* 5206, April 20, 1938 (Cal. Acad.); Salinas River, Neponset, Monterey Co., *Abrams* 4029, September 29, 1903 (D. S.); Carmel River, Monterey Co., *Mrs. Joseph Clements*, August 15, 1910 (Pom.); Oakland, Alameda Co., *Wm. Holder*, State Survey 2578 (U. C.); Livermore Pass, Mt. Diablo region, Alameda Co., *Burt Dary*, May, 1898 (U. C., Pom.); on mucky flats subject to overflow, Stone Lagoon, Humboldt Co., *J. P. Tracy* 5865, August 7, 1921 (U. C.). OREGON: Marshfield, Coos Co., *Walton Haydon* 527, 1914 (Cal. Acad.); salt marsh on tide flats, Toledo, Lincoln Co., *J. C. Nelson* 2355, July 5, 1918 (G.); salt marshes, Tillamook, Tillamook Co., *T. J. Howell*, July, 1882 (B., U. C., Ore.); muddy banks bordering salt marsh at Bay City, 7 miles n. of Tillamook, Tillamook Co., *G. B. & R. P. Rossbach* 627, June 22, 1938 (D. S., G.); Hot Lake, Union Co., *Piper* 5198, June 22, 1921 (U. S.). WASHINGTON: North Head, *E. A. McGregor*, August 13, 1907 (D. S.); near Egbert Spring, Douglas Co., *Sandberg & Leiberg* 346, July 1, 1893 (G., U. S., B., Cal. Acad., U. C., Ore.); in pasture on Johnson Creek, Hudson's place, north of Omak, Okanogan Co., *C. B. Fiker* 1155, September 1, 1932 (D. S.); tide land, Marysville, Snohomish Co., *J. M. Grant*, July, 1927 (Pom.), June, 1920 (D. S.). BRITISH COLUMBIA: shores of alkaline lakes, Kamloops, *Macoun* 2673, June 13, 1889 (Can.); vicinity of Sidney, Vancouver Island, *Macoun* 86988 (Can.); in a salt marsh at Sidney, Vancouver Is., *Macoun* 78519, July 28, 1908 (Can.).

The following citations are of plants with a few papillae on the rim at the summit of the seed.

PRINCE EDWARD ISLAND: Charlottetown, Queens Co., *Fernald & St. John* 210, August 13, 1914 (U. S., G., Cal. Acad., D. S., U. C., W.); Summerside, Prince Co., *Churchill*, July 21, 1901 (G.). NEW BRUNSWICK: Tracadie, Gloucester Co., *Blake* 5648, September 10, 1913 (G.); beach, Portage Island, Northumberland Co., *Blake* 5681, September 17, 1913 (U. S., G.); Shediac Island, Westmoreland Co., *F. T. Hubbard*, August 5, 1914 (G.). NOVA SCOTIA: Cape Breton Island, *Macoun* 19033, August 19, 1898 (G.); Canso, Guysborough Co., *Fowler*,

<sup>1</sup> Marked *S. tenuis* Robinson, Syn. Fl. N. Amer.

<sup>2</sup> Cited under *Tissa tenuis* Greene ex Britt. in Bull. Torr. Bot. Club, xvi. 128 (1889).



August 6, 1901 (U. S.). MAINE: Warren Is., Islesboro, Waldo Co., G. B. & R. P. Rossbach, September 4, 1935 (G.). MASSACHUSETTS: Harwich, Barnstable Co., Fernald 16783, July 13, 1918 (U. S.); shore of Great Tisbury Pond, Chilmark, Martha's Vineyard, F. C. Seymour 1199, July 25, 1916 (U. S.). RHODE ISLAND: Westerly, Washington Co., Woodward, August 4, 1917 (G.). NORTH CAROLINA: Bettie, Carteret Co., L. F. & F. R. Randolph 816, July 17, 1922 (G.). TEXAS: Morgan's Point, Harris Co., E. J. Palmer 11959, May 20, 1917 (U. S., U. C.); Port Arthur (McFadden Ranch), Jefferson Co., Martin & Warren, May 9, 1930 (U. S.). WASHINGTON: vicinity of Port Townsend, Jefferson Co., M. A. Barber 156, August 12, 1899 (G.); Straits of De Fuca, nw. coast of America, W. Arnott 3 (B., marked *Lepigonum neglectum* Kindb. 1861).

Plants belonging to *S. marina* may be either smooth- or papillose-seeded. At first thought one would feel that plants with such different seeds should not be included in the same entity. However, measurements of lengths of capsules, sepals, petals, stipules, etc. of smooth-seeded plants do not differ from those of papillose-seeded plants. Furthermore, the seed-size and -surface are the same, the only difference being the presence or absence of glandular papillae. Indeed occasional plants have a few scattered papillae upon the rim of the seed or only one or two upon the whole seed (see citations). One may not worry about the fact that the seeds may be of these two types, for many other species are similar in this respect, *e. g.* *S. villosa*, *S. platensis*, *S. canadensis*, *S. ramosa*, *S. fasciculata*, *S. pycnantha*, and *S. diandra*. Further to clinch this decision, the distribution of plants with smooth seeds practically coincides with that of plants with papillose seeds (see MAPS 7 and 8). It is true that papillose-seeded plants have not been collected as often in the interior of the country; but the fact remains that there, few collections even of smooth-seeded plants have been made. It has not been proved that there papillose-seeded plants are not as widespread as smooth-seeded ones.

In smooth-seeded plants on the east coast, Profs. Fernald and Wiegand<sup>1</sup> have noted that the bracts at the uppermost nodes are more conspicuous than in the papillose-seeded ones. It is true that on the east coast the majority of the papillose-seeded plants have bracts at the upper nodes measuring only 1.5–2.5 mm. long, while those of smooth-seeded plants measure 3–7 mm., always using most mature plants. Exceptions in the same region may be found, however, showing papillose-seeded plants with long bracts and smooth-seeded ones

<sup>1</sup> RHODORA, xii. 157 (1910).

with short bracts. In studying this same problem on the west coast, the vast majority of mature individuals of smooth- and papillose-seeded plants have been found to have the uppermost bracts 3 mm. or less in length and only rarely does one find longer bracts, which then occur in both kinds of plants.<sup>1</sup> With all this evidence in favor of the unity of both kinds of plants, the separate species *S. leiosperma*, taken up by Fernald and Wiegand,<sup>2</sup> is not tenable. Because of the fact that the character of the upper part of the inflorescence being leafy does not hold over a great part of the range, and never does mark a sharp division between the two kinds of plants, *S. leiosperma* is not tenable, even as a variety.

Linnaeus under *β. marina* of 6. *Arenaria rubra* in Sp. Pl. i. 423 (1753) gives the following:

*β. Arenaria foliis linearibus longitudine internodiorum. marina.*

*Hort. cliff. 173. Gron. vûg. 161. Roy. lugdb. 451.*

*Spergula marina nostras. Raj. hist. 1034.*

*Alsine spergulae facie media. Bauh. pin. 251.*

*Habitat α in Europae arenosis collibus, β. in litoribus marinis. ☉*

*Stamina in campestri certe 10, sunt; in maritima prope*

*Aboam stamina tantum 5 observavit D. Kalm.*

The Linnaean herbarium has the type of *Arenaria rubra* L. but nothing marked *β. marina* or bearing the Linnean phrase-name, above quoted, describing *β. marina*, or bearing any of the synonymous phrase-names occurring in the quotation above.

Linnaeus, Hort. Cliff. 173 (1737), gives, "3. *Arenaria foliis linearibus longitudine internodiorum.*"<sup>3</sup> The Clifford herbarium contains three specimens filed under "*Arenaria foliis longitudine internodiorum*"<sup>4</sup> but none of them have this phrase on the sheet. One of these sheets bears the number 6 and the phrase, "*Alsine spergulae, facie media*" and, in a different hand, "*Spergula saginoides.*"<sup>5</sup> *Alsine spergulae facie media* C. Bauhin, Pinax, 251, occurs as a synonym of *Arenaria foliis linearibus longitudine internodiorum* in Hort. Cliff.

<sup>1</sup> A collection made by Prof. L. R. Abrams 13691, at Mugu Pt., Ventura Co., California (see citations), shows plants with smooth seeds and others with papillose seeds but otherwise with no difference whatever, the bracts even being identical. These seed-differences were checked by using seeds from within the capsules.

<sup>2</sup> RHODORA, xlii. 157 (1910).

<sup>3</sup> "*Internodiorum*" of Sp. Pl. (1753) is a *lapsus calami*, corrected in ed. 2.

<sup>4</sup> I understand that the Clifford herbarium, as well as the Linnaean herbarium, is arranged in the order of the book. These sheets bear in the lower left corner in pencil, "p. 173 *Arenaria*, 3" which corresponds to the page-number and species-number under *Arenaria* in Hort. Cliff.

<sup>5</sup> In the herbarium of Clifford in the British Museum, photograph in Gray Herbarium. Data from these sheets by courtesy of Mr. C. A. Weatherby.

and in Sp. Pl. Therefore this plant, bearing Bauhin's phrase-name was probably part of the basis of *Arenaria foliis* etc. of Linnaeus. The Clifford specimen is in good condition, with mature capsules and papillose seeds, and corresponds in habit and all measurements with the species under discussion.

Another sheet has the number 7 and the inscription, "*Alsine* (folio flore subcaeruleo, [crossed out]), *spergulae facie minor*" and in a different hand "*Arenaria rubra*."<sup>1</sup> This phrase is very similar to that under *Arenaria rubra* *α. campestris*, L.<sup>2</sup> namely, "*Alsine, spergulae facie, minor s. Spergula minor, subcaeruleo flore.*" The plant is immature, but resembles that upon the sheet last discussed which probably belongs to *β. marina* of Linnaeus. One cannot be sure, then, whether this plant is the type of *α. campestris* L.<sup>3</sup> or was considered as belonging to the *marina* phrase-name by Linnaeus but never relabeled as such. At least it cannot be considered the type of *Arenaria rubra, β. marina* L.

The third sheet has the label, "*Alsine montana capillaceo folio*. C. B. p. 251. *Spergula dicta major. Spergula facie minor. Spergula minor flosculis sub . . .* [word illegible] C. B."<sup>4</sup> The plant is *Scleranthus annuus* fide Mr. C. A. Weatherby. Since these citations do not appear in the synonymy of *Arenaria rubra* in Sp. Pl. or in any of the references given there and since the plant is not even a *Spergularia*, this cannot be the type of Linnaeus' *β. marina*.

Therefore, of these three sheets only one, namely that with no. 6 and the inscription "*Alsine spergulae facie media*" can be the type of *Arenaria rubra β. marina* L., since Linnaeus gives "*Alsine spergulae facie media*" as synonymous with *Arenaria rubra β. marina* in Sp. Pl. and with "*Arenaria foliis linearibus longitudine internodiorum*" in Hort. Cliff.

Further to solidify the basis for the retention of the name *marina*, Clayton 475, cited by Gronovius, Fl. Virg. 161 (1739) may be considered.<sup>5</sup> The reader will recall that this reference was given by Linnaeus under *Arenaria rubra β. marina*. Clayton 475 bears the

<sup>1</sup> In the herbarium of Clifford in the British Museum, photograph in Gray Herbarium. Data from these sheets by courtesy of Mr. C. A. Weatherby.

<sup>2</sup> Sp. Pl. i. 423 (1753).

<sup>3</sup> *Arenaria rubra α. campestris* Linn. Sp. Pl. i. 423 (1753) is certainly a mystery. Whether Linnaeus meant it to be a separate variety under *A. rubra* or merely that part of *rubra* not belonging to *β. marina* and therefore synonymous with *A. rubra*, I do not know. This is the only specimen I have been able to locate which is at all traceable to *α. campestris*.

<sup>4</sup> This corresponds to III under *Alsine alpina* in C. Bauhin, Pinax, 251 (1623).

<sup>5</sup> In the British Museum—photograph in Gray Herbarium.



phrase-name "*Arenaria foliis linearibus longitudine internodiorum*, Hort. Cliff. p. 173", which is cited by Gronovius in his *Flora Virginica*. The specimen is mature and bears papillose seeds like those of the plants cited for *S. marina* in this monograph and like those of the type of *Arenaria rubra*  $\beta$ . *marina* L.

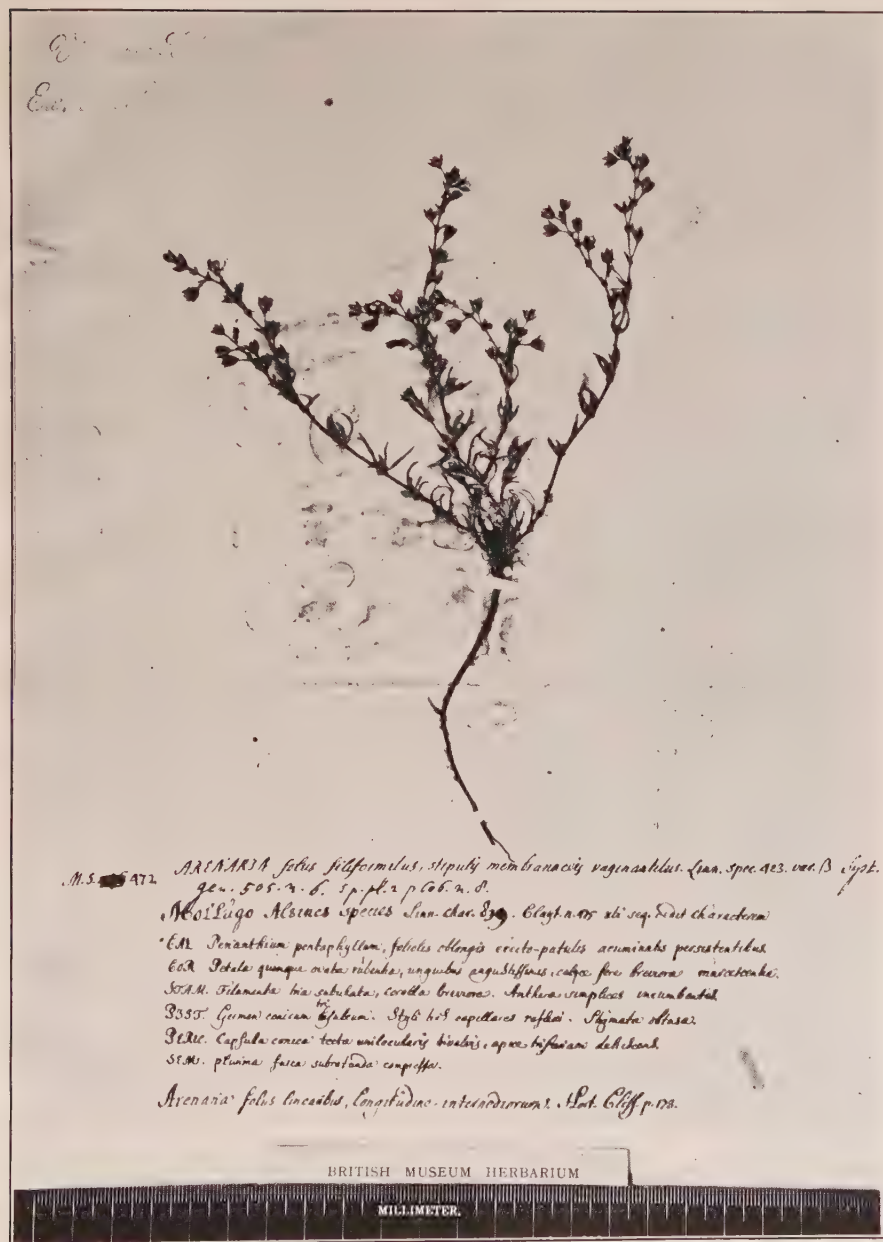
With actual specimens known as the basis for *Arenaria rubra*  $\beta$ . *marina* L., all that remains is to confirm the first use of the epithet in the specific rank. This is *Arenaria marina* All. Fl. Pedem. ii. 114 (1785).<sup>1</sup> Allioni gives no direct authority for the epithet, but he does give the Linnaean phrase-name and cites Gouan, Fl. Monspel. 242 (1765). Although Gouan at this place uses the Linnaean names (*A. rubra*,  $\alpha$ . *campestris* and  $\beta$ . *marina*), he does not refer to Linnaeus. He does, however, cite his own Hortus Monspelensis, 218 (1762), where reference is made to the Species Plantarum and the Linnaean phrase-name is quoted under the second variety (*marina*). The origin of Allioni's epithet may thus be traced pretty clearly to Linnaeus.<sup>2</sup>

According to Burnat, Fl. Alp. Marit. i. 274 (1892), nearly all of Allioni's specimens labelled *A. marina* are *S. media* (*S. marginata* of Burnat's treatment). But whatever Allioni's plant, his epithet is taken from Linnaeus and his combination must be kept for the group represented by the Linnaean type. Since, as shown above, the identity of this type is clear, there is no occasion to reject the epithet *marina*, as has been done by Briquet, Prod. Fl. Corse, i. 492 (1910), and others.

The type of *Tissa salina* var. *sordida* Greene does not differ in any characters from papillose-seeded plants of *S. marina*. Greene says, "herbage viscid and hairy; fl. in unilateral leafless racemes: . . ." Quantity of pubescence has little significance in classifying *Spergularias* and within *S. marina* itself all degrees may be found from very

<sup>1</sup> The citation often made, *Arenaria marina* Pall. Reise, iii. 603 (1776) is an error. Pallas used the name *A. maritima*, and only as a *nomen nudum*.

<sup>2</sup> Allioni also refers to his own Auctarium ad Synopsis methodicam Stirpium Horti Regii Taurensis, published in Miscellanea Taurinensia, v. 53-96 (1770-73). Here (p. 87) Allioni describes *Arenaria maritima* (overlooked by the *Index Kevenensis* and most, if not all, authors), as an independent new species, said to differ from *A. campestris* in having ten stamens, capsule greatly exceeding the calyx and winged seeds. He particularly emphasizes the number of stamens. If, as Allioni evidently supposed, *A. maritima* were really synonymous with the true *S. marina*, the former name, as the earliest in the specific category, would have to be taken up for the present species. But the description, especially the number of stamens, suggests *S. media* rather than *S. marina*; and Burnat mentions no specimen of Allioni's labelled *A. maritima*. Until this last name can be attached to a definite type, it would be most unwise to take it up.



ARENARIA RUBRA β. MARINA L.

Clayton's 475, the basis of the Gronovian reference given by Linnaeus; photograph by courtesy of Mr. JOHN RAMSBOTTOM.





sparse hairs only on the pedicels to a dense covering over the whole plant. The flowers often occur in unilateral racemes, leafy or not, throughout the range.

*Tissa salina* var. *Sanfordii* Greene is also regarded as a synonym because, although the author has been unable to find the type, a specimen collected by C. F. Baker 2865, April 27, 1903, and determined by Greene as var. *Sanfordii* is identical in papillose seeds, capsules, sepals, size and habit with many of the collections here cited under *S. marina*. Greene's description, "Stems erect repeatedly dichotomous; herbage scarcely viscid and only slightly pubescent: inflorescence partly dichotomous, only the ultimate branchlets unilaterally racemose: seeds dark brown, nearly smooth, wingless," has nothing except "stems . . . repeatedly dichotomous," which makes it at all different from *S. marina*. *S. marina* may, indeed, have several times compounded cymes. A high degree of dichotomy is seen in the type of *S. marina* var. *tenuis* (see below) but the Baker specimen discussed above has capsules too large for var. *tenuis*.

Greene's *Tissa sparsiflora* has as distinguishing characters: stems very long, nearly a foot in length; "flowers mostly solitary, one to each pair of leaves"; "slender pedicels shorter than the leaves"; "pedicels not forming a distinct cyme even at the ends of the branches"; "capsule ovate, obtusish, exceeding sepals." Greene seems to have named this plant because it came from the "interior of the continent" and because of its sprawling, long-noded stems which necessitates the flowers seeming to be sparse. All flowers of the genus are solitary, *i. e.* one at each node. Perhaps Greene meant that the plants were not cymose, for certainly pedicels do not make cymes. The type collection,<sup>1</sup> however, definitely has compound cymes, though they are obscured by general leafiness and sprawling stems. The description of the capsule shows no difference from that of *S. marina* and the seeds are typical of smooth-seeded plants. Therefore no distinguishing character remains but the sprawling stems, and that certainly is not sufficient for the separation of a taxonomic entity. More recent collections from Wyoming<sup>2</sup> show plants with much shorter stems and in some cases not at all lax.

<sup>1</sup> Seven Mile Lake, Wyoming, *Aven Nelson* 1158, October, 15, 1894. Prof. Nelson says that the label designates an uncharted lake 7 miles sw. of Laramie on the Woods Landing Road.

<sup>2</sup> Laramie, Wyoming, *Aven Nelson* 1868, September 3, 1895 (U. C., Pom.); Soda Lakes, *Aven Nelson* 5349, September 24, 1898 (U. C.).

13. Var. **tenuis** (Greene), comb. nov. (MAP 9). *Stems more highly branched: inflorescence crowded, with many flowers; sepals usually shorter, 1.6–3.8 mm. long; petals usually shorter, 1.4–2.2 mm. long; mature capsules usually shorter, 3–4.4 mm. long, exceeding the calyx by 0.6–2 mm.: seeds as in the typical variety, though usually smooth in the specimens collected.*—*Lepigonum tenue* Greene, Pittonia, i. 63 (1887). *Tissa tenuis* Greene ex Britt. in Bull. Torr. Bot. Club, xvi. 128 (1889), in part, as to plants, including the *Greene* collection and excluding the *Rothrock* and *J. C. Nevin* plants, which are characteristic *Spergularia marina*; Greene, Fl. Francisc. 129 (1891) and Man. Bot. San Francisc. Bay, 37 (1894). *S. tenuis* (Greene) Robins. in Proc. Am. Acad. xxix. 311 (1894) and in Gray, Synop. Fl. i, pt. i, 251 (1897); Jepson, Fl. Calif. pt. 5, 494 (1914) and Man. Fl. Pl. Calif. 360 (1923). *S. tenuis* var. *involutrata* Robins. in Gray, Synop. Fl. i. pt. 1, 251 (1897). *Tissa salina* var. *involutrata* (Robins.) Jepson, Fl. W. Mid. Calif. 170 (1901). *T. salina* var. *tenuis* (Greene) Jepson, Fl. W. Mid. Calif. 170 (1901). *S. salina* var. *involutrata* (Robins.) Jepson, Fl. W. Mid. Calif. ed. 2, 156 (1911). *S. salina* var. *tenuis* (Greene) Jepson, Fl. W. Mid. Calif. ed. 2, 156 (1911); Munz, Fl. So. Calif. 164 (1935). *Alsine tenuis* (Greene) House in Am. Midl. Nat. vii. 133 (1921).—NORTH AMERICA: low alkaline places in the valleys of central California. CALIFORNIA: in alkali soil near Delano, Kern Co., *Burt Dary* 2438, 1896 (U. C.); Tulare, Tulare Co., *K. Brandegee*, April, 1889 (G.); Hollister, San Benito Co., *Setchell*, April 14, 1897 (U. C.; see the same collection under *S. marina*); near Hollister, San Benito Co., *Eastwood & Howell* 4297, May 4, 1937 (Cal. Acad., G.; see coll. from same place, no. 4298, under *S. marina*); marsh, Alviso, Santa Clara Co., *Dudley*, November 9, 1903 (D. S.); near Newark, Alameda Co., *Burt Dary* 1113, May 6, 1895 (U. C.); Mt. Eden, Alameda Co., *K. Brandegee*, April, 1891 (G., type of *S. tenuis* var. *involutrata* Robins.); Alameda, Alameda Co., *Greene*, May 17, 1887 (G., D. S., U. C., Notre Dame, TYPE of *Lepigonum tenue* Greene); Byron Springs, Contra Costa Co., *K. Brandegee*, May 8, 1916 (Pom.); Stockton, San Joaquin Co., *J. A. Sanford* 89, 1890–91 (U. C.; note on same sheet a collection, no. 341, of typical *S. marina* from same place); 12 miles north of Dixon, Yolo Co., *Doris K. Kildale* 5032, May 8, 1928 (D. S.; note coll. 5033 from same place under *S. marina*); hard-packed alkaline clay depression in the plains, 5 miles west of Colusa, Colusa Co., *G. B. & R. P. Rossbach* 638, May 31, 1938 (G., D. S., Cal. Acad.; note coll. no. 641 of *S. marina* in same herbaria from same place); Williams, Colusa Co., *K. Brandegee*, about 1891 (G., seeds papillose); roadside ditches, alkaline mud  $3\frac{3}{4}$  miles south of Maxwell, Colusa Co., *G. B. & R. P. Rossbach* 640, May 31, 1938 (G., D. S.); alkaline ground near irrigation ditch, growing with *Distichlis*, 2 miles so. of Maxwell, Colusa Co., *G. B. & R. P. Rossbach* 636, May 31, 1938 (G., D. S., U. S., Cal. Acad., Pom., U. C., seeds papillose; note no. 637 under *S. marina* from the same place).

These plants are common within their range but nearly always occur along with characteristic *S. marina*. Var. *tenuis* always differs in being more slender, more highly branched, and more crowded with smaller flowers. Usually the capsule exceeds the calyx more than in typical *S. marina*. While collecting and observing these plants in 1938 from Colusa Co. to Yolo Co., the author found that the variety was always easily distinguished from the more typical forms of the species, no intergrades being found. The variety was also yellowed and dropping seeds, while the ordinary form of the species still remained green, with flowers and many buds. It would be interesting to note whether this difference in time of fruiting holds throughout its range. It certainly is evident in the Hollister collections, no. 4297 and 4298, of *Eastwood & Howell*. In spite of the fact that the only distinguishing characters are those of degree, these observations indicate to me that *Lepigonum tenue* of Greene should be retained in varietal rank.

*Lepigonum neglectum* var. *tenuis* Kindb. Synop. Lepig. 6. (1856) is based upon a collection, "Ad littora maris Galliae prope Calvados," by *Lenormand* and is characterized briefly by Kindberg as having small flowers with greatly protruding capsules. Since the *Lenormand* collection cannot be found either in Uppsala or in Stockholm, nothing can be done at present to clear the situation—the use of the same epithet for groups evidently with the same characterization. The situation is further complicated by the fact that *L. neglectum* and *L. marina* are synonyms. It seems doubtful that the two varieties can be the same.

14. *S. ECHINOSPERMA* Čelak. (PLATE 590, FIGS. 2a–2c and MAP 10). Annual; 1–∞ diffuse stems 5–20 cm. long; internodes below the inflorescence sparsely glandular-pubescent, 5–40 mm. long, 0.2–1.4 mm. in diameter; lower bracts foliaceous, about 12 mm. long, the upper ones minute, 1–3 mm. long; leaves sparsely glandular-pubescent, 8–35 mm. long, 0.4–1.4 mm. broad, usually not fascicled or with only 1 leaf in the axil; stipules deltoid, shorter than broad, 1.4–2.4 mm. long; inflorescence a lax cyme; the lowest internodes 7–25 mm. long, 0.2–0.6 mm. in diameter; sepals ovate, sparsely glandular-pubescent, 2.4–3.6 mm. long; petals pink or rosy at the apex, 1.6–2.8 mm., as much as 0.2–1.2 mm. shorter than the calyx; stamens 1–4; styles 3, separated to the base, 0.3–0.4 mm. long; mature capsules 3.4–5 mm. long, exceeding the calyx by 0.4–1.8 mm.; fruiting pedicels filiform, reflexed or not, 5–11 mm. long; seeds 0.5–0.8 mm. long, deep reddish-brown or nearly black with a silvery tinge, rounded in outline, surface always roughened, often sculptured in irregular, vermiform pattern with irregular, short



ridges between the sculpture, usually with dark brown, glandular papillae which sometimes are hardened, with a broad scarious white wing or not winged.—Arch. Naturw. Land. Boehm. iv. 867 (1881), published as a provisional name *i. c.* in parentheses after *S. rubra* var. *echinosperma* Celak. *Tissa diandra* sensu Britt. in Bull. Torr. Bot. Club, xvi. 128 (1889), in part, including only the *Lindheimer* and *Drummond* collections, excluding all other collections, which are of *S. diandra* and *S. atosperma*, *q. v.*, non *Arenaria diandra* Guss. (1827); sensu Howell, Fl. Nw. Coast, 89 (1903), in part, including only the Texan plants, non *Arenaria diandra* Guss. (1827). *S. diandra* sensu Robins. in Proc. Am. Acad. xxix. 310 (1894), in part, including Texan plants only, non *Arenaria diandra* Guss. (1827). *S. salsuginea* var. *bracteata* Robins. in Gray, Synopt. Fl. i. 251 (1897), in part, including the Texan plants only. *Tissa bracteata* (Robins.) Small, Fl. Se. U. S. 418 (1903), in part, including Texan plants only.—NORTH AMERICA: introduced in Texas and Alabama from the Old World. ALABAMA: low brackish, sandy seashore of Westfowl River, *Mohr*, April 7, 1870 (U. S.). TEXAS: Galveston Co.: Galveston, *Lindheimer*, 1843 (G., B., one of the Berlin sheets marked *Lepigonum neglectum* by Kindberg, 1861); beach, Galveston, *Joor*, April 19, 1875 (U. S.); Galveston Island, *Tharp* 2891, May 30, 1924 (U. S.). Brazos River, *Drummond*, 1833 (G., type of *S. salsuginea* var. *bracteata* Robins., K.). Nueces Co.: Corpus Christi, *Heller* 1413, March 5–12, 1894 (G., U. S., U. C.); Corpus Christi, *Benke* 5360, March 30, 1930 (G.). Padre Island (sw. shores of Texas), *Tharp* 5544, March 16, 1929 (U. S.). Pecos Co.: moist fine sands along Pecos River, near Pecos, *E. J. Palmer* 34027, May 18, 1928 (G.). Without definite locality, Texas, *Marek* (?), March (B.).

As is evident in the synonymy, this species has been included in *S. diandra*, which is also introduced, although only in the northwestern states and perhaps farther east. These two plants are very similar in habit, although *S. echinosperma* has the larger capsules not globose. *S. echinosperma* is easily distinguished, furthermore, by larger, brown, rounded seeds which are never so deeply sculptured as are usually the black, pyriform seeds of *S. diandra*.

15. *S. CONGESTIFOLIA* I. M. Johnst. (PLATE 590, FIG. 4a–4b and MAP 11). Suffruticose perennial: tap-root fibrous, with a soft, rough bark, extending deep into soil, up to 5 mm. thick: caudex heavy, branched or unbranched, bearing many (often 10–20) small crowded stems, 6–20 cm. long; internodes of the stem below the inflorescence usually very short, 1.5–8 mm. long and less than 1 mm. in diameter: leaves densely fascicled, filiform, strongly mucronate, sparsely glandular-pubescent, falcate, 3–10 mm. long, 0.3 mm. wide; stipules white, connate toward the base, finely lacerate to nearly two thirds the length, giving the plant a silvery cast, 3–5 mm. long; inflorescence an open cyme, with much longer internodes, erect, high above leafy parts, with minute, foliaceous bracts

1-3 mm. long: *sepals* ovate-lanceolate, glandular-pubescent, 5-5.5 mm. long; *petals* white or rosy-tinged, ovate, 4.5-5.7 mm. long; *stamens* 10; *styles* 3, 1-1.5 mm. long, united in young flowers and dividing probably to the base as flower matures: *capsules* (mature or nearly so) 5-6 mm. long, equal to or slightly exceeding the calyx: *fruiting pedicels* filiform, not reflexed (?), the lower 10-23 mm., usually 12-15 mm. long: *seeds* not winged, mature ones unknown.—Contrib. Gray Herb. lxxxix. 90 (1928); Macbride, Field Mus. Pub. Bot. xiii.—Fl. Peru Pt. ii, no. 2, 630 (1937).—SOUTH AMERICA: found only in Peru near Mollendo, on arid hills of the coast. PERU: PROV. ISLAY: Dept. Arequipa: Mollendo: open places in the green belt, hillside back of port, Johnston 3567, October 16, 1925 (G. TYPE, U. S., F. M.); desert hills after October rains, A. S. Hitchcock 22415, November 17, 1923 (U. S.); carpeting arid hills near ocean, fog vegetation, Ynes Mexia 04166, November 16, 1935 (G., U. C.).

This is a very striking and beautiful species, different from all the others in its congested, falcate leaves just protruding from silky masses of lacerated stipules and its large flowers in tall inflorescences. There is need of fully fruiting material for complete knowledge of the species.

16. *S. ARBUSCULA* (Gay) I. M. Johnston. (PLATE 590, FIGS. 5a-5e and MAP 12). A small perennial shrub: *caudex* very heavy, ligneous, branched, bearing many erect or diffuse, rigid stems 6-30 cm. tall, becoming woody below, as much as 1 cm. thick, covered with a rough bark, scrubby with persistent, shrivelled leaves, stipules, and small, lateral branches: *internodes of the young branches below the inflorescence* densely covered with spreading, glandular pubescence, very much congested or as much as 1-16 mm. long, 0.4-0.8 mm. in diameter: *leaves fascicled*, glabrous or sparsely glandular-pubescent, not mucronate or very shortly so, very fleshy, 2-12 mm. long, 0.6-3 mm. broad; *stipules* conspicuous, shining, broadly lanceolate, not much longer than broad, apex erose sometimes to as much as one-half its length, 2.5-5 mm. long: *inflorescence* a compact cyme; *internodes crowded together* or as much as 4 mm. long, heavily glandular-pubescent; *bracts* wanting or foliaceous and as much as 2 mm. long: *sepals* linear, usually glabrous, sometimes glandular-pubescent at the base, 2.4-5 mm. long; *petals* white, ovate, 1.8-4 mm. long, as much as 0.4-1.6 mm. shorter than the calyx; *stamens* 10; *styles* 3, separated to the base or nearly so, 0.8-1.2 mm. long: *mature capsules* 1.6-3.6 mm. long, equal to or more often as much as 0.2-1.8 mm. shorter than calyx: *fruiting pedicels* filiform, glandular-pubescent, not reflexed, 1-3 mm. long: *seeds* brown or nearly black, rounded at apex, shining, usually deeply sculptured in interwoven, vermiform pattern, occasionally with faint sculpture most noticeable near point of attachment of seed, 0.6-0.8 mm. long, not winged.—Contrib. Gray Herb. lxxxv. 40 (1929). *Paronychia arbuscula* Gay, Fl. Chil. ii. 520 (1846); Reiche, Fl. Chile,

i. 211 (1896). *Arenaria teretifolia* Philippi, Fl. Atac. 10 (1860). *A. lignosa* Philippi, l. c. *S. lignosa* (Philippi) Rohrb. in Linnaea, xxxvii. 244 (1871-73); Philippi in Anal. Univ. Chil. lxxxi. 764 (1892). *S. fruticosa* Philippi, l. c. 763 (1892). *S. teretifolia* (Philippi) Philippi, l. c. lxxxi. 764 (1892). *Tissa lignosa* (Philippi) Reiche, Fl. Chile, i. 198 (1896). *T. teretifolia* (Philippi) Reiche, l. c. (1896).—SOUTH AMERICA: along the sea coast of Chile, in the provinces of Antofagasta, Atacama, and Coquimbo. CHILE: PROV. ANTOFAGASTA: Dept. Taltal: sandy and rocky point on slope just back of Punta Reyes, vicinity of Aguada de Miguel Diaz ca. 24° 35' S., Johnston 5357, December 1-4, 1925 (G., marked "flowers like type of *A. lignosa* Philippi in size and shape of calyx" by the collector, the plant with very small capsules, petals, and reflexed sepals); local in crevices on very dry granitic outcrop in a small quebrada just south of Posado Hídalgo, Johnston 5659, December 14, 1925 (G., U. S., seeds present); Cachinal de la Costa in Deserto Atacama, Philippi, December, 1853 (Santiago, photo. and fragment in G., type of *Arenaria lignosa* Philippi, sepals linear, reflexed, longer than the capsule); Cachinal de la Costa in Deserto Atacama, Philippi 170 (Santiago, photo. and fragment in G., type of *Spergularia teretifolia* Philippi, with short, broad, blunt sepals); Desert of Atacama, Philippi 65 (B., with short, narrow, reflexed sepals, marked *Arenaria lignosa*). PROV. ATACAMA: Dept. Chanaral: small stout bush 2-6 dm. tall, on hillsides and about rocks near the sea, hills back of El Barquito, vicinity of Puerto de Chanaral, 26° 23' S., Johnston 4753, October 28-29, 1925 (G., U. S., seeds present). Dept. Copiapo: about rocks and in sand, 1-1.5 dm. tall, on a small point just north of Caldera ca. lat. 27° 3' S., Johnston 5066, November 22, 1925 (G., U. S., seeds present, 2 of the 3 plants with short, broad sepals, not reflexed, marked "a fair match for type of *A. teretifolia* Philippi" by Dr. Johnston); same locality, Johnston, 6289, November 22, 1925 (G., with long sepals); vicinity of Caldera, Gigoux (G., two sheets, one not dated and one dated 1922); Caldera, Werdermann 385, November, 1924 (G., U. S., N. Y., F. M., B., Cal. Acad., U. C., over-mature); Morro de Copiapo se sur del puerto de Caldera, Espinosa, November 9, 1936 (D. S.), with long sepals, no seeds). Dept. Freirina: alt. ca. 20 m. Huasco, Werdermann 132, November, 1923 (G., F. M., B., Cal. Acad., U. C.); Huasco, Jaffuel 1166, November 2, 1930 (G., seeds present, sepals short and broad); Huasco, Philippi<sup>1</sup> (Santiago, photo. and fragment in G., type of *Spergularia fruticosa* Philippi, sepals very long and broad, far exceeding the capsule). No definite locality: Desert of Atacama, Morong 1172, September and October, 1890 (G, U. S., seeds present on G. spec., some plants with short broad sepals, others with them much longer); Atacama, C. Porter (K.). PROV. COQUIMBO: Dept. Ovalle: Limari, Frai Jorge, Werdermann 894, November, 1925 (G., U. S., N. Y., F. M., B., Cal. Acad., Arnold Arb., U. C., seeds on B. spec. only, very long sepals);

<sup>1</sup> Date from Anal. Univ. Chile, lxxxi. 763 (1892), is October, 1866.



Loma, Frai Jorge, *C. & I. Skottsberg* 855, December 8, 1917 (N. Y.), seeds present; Coquimbo, ded. *Philippi*, 1888 (B., marked *Spergularia fruticosa*); Chile, no locality on label,<sup>1</sup> *Cl. Gay* (K., G., TYPE COLLECTION of *Paronychia arbuscula* Gay, in poor condition).

There is a great range of variation among the plants cited and described above. There are plants with short, broad, blunt sepals about equal to the capsule, as in the type of *Arenaria teretifolia* Philippi, and there are others with long blunt sepals greatly exceeding the capsule, as in the type of *Spergularia fruticosa* Philippi. The type of *Paronychia arbuscula* Gay has the "calyx lobes oblong-ovate, very glabrous, equal to or slightly exceeding the membranaceous petals." Often plants may have linear, reflexed sepals, as in the type of *Arenaria lignosa* Philippi. Though most of the collections lack seeds, those seen show no fundamental variation. It should be said, however, that seeds of plants with linear, reflexed sepals have never been seen. In spite of the above variations it seems quite possible that they all belong to the same taxonomic unit, for they all have the distinctive, shrubby habit, the same type of stipule, number of stamens, type of style, etc.

(To be continued)

GRASSES AND SEDGES OF WOODSTOCK, VERMONT.—In 1932, in reviewing Miss E. M. Kittredge's "Ferns and Flowering Plants of Woodstock,"<sup>2</sup> I commented with regret on the omission of the grasses and sedges. This omission has now been repaired by the publication<sup>3</sup> (as before, under the patronage of Miss Elizabeth Billings) of a 27-page pamphlet listing the members of those families known to occur in the Woodstock area. Like its predecessor, it is very well printed on excellent paper; the quality of its poetical quotations is as high as ever; and the identification, cataloguing and comment have been done with like care and thoroughness.

Mechanically, it is not quite so good. Pages 20 and 21 have been transposed; page 19 is set in italic type when roman would seem to have been required; and a number of minor errors (such as the strange transformation of Persoon into "Jessu" on page 14) have managed to run the gauntlet of proofreading. The statement that until 1934 *Carex castanea* was known from no other station east of the Green Mountains is, as phrased, misleading. It is probably true of the latitude of Woodstock, but *C. castanea* was reported in Kennedy's Flora of Willoughby in 1904 and is not uncommon in northeastern Vermont. However, if it be not taken as infallible in minutiae (and what work can be?), this list well fulfills the functions of a regional flora—to serve as a guide and stimulus to local collecting and to

<sup>1</sup> "Sandy places in Prov. Coquimbo."—Gay, Fl. Chile, ii, 520 (1846).

<sup>2</sup> RHODORA, xxxiv, 56 (1932).

<sup>3</sup> KITTREDGE, E. M. *Grasses and Sedges of Woodstock, Vermont* (with foreword by Elizabeth Billings). The Elm Tree Press, Woodstock. 1939.

furnish useful phytogeographic records. It worthily supplements and completes Miss Kittredge's previous publication.—C. A. W.

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LUDWIGIA MICROCARPA IN MISSOURI.—The southern coastal plain species, *Ludwigia microcarpa* Michx., has been recorded as ranging from North Carolina to Florida and Louisiana.

Recently the author was collecting in Oregon County, southern Missouri, and found this species locally abundant in a swampy meadow in a valley along the spring branch of Greer Spring, near Greer. This swampy meadow was formed by the seepage of a small spring, locally known as "Hatcher's Spring" which rises in the valley of Greer Spring branch, and joins the latter after a flow of fifty feet. *Ludwigia microcarpa* was associated with *Panicum agrostoides*, var. *ramosius* (Mohr) Fern., *Eleocharis calva* Torr., *Fuirena simplex* Vahl, *Parnassia grandifolia* DC., *Galium tinctorium* L. (*G. Claytoni* of Gray's Manual, 7th edition), and *Eupatorium perfoliatum* L.

Its occurrence here represents a northern extension of range for the species of several hundred miles and places it within the range of Gray's Manual. Specimens of the plant have been deposited in the Gray Herbarium, Missouri Botanical Garden Herbarium, and the herbarium of Field Museum. The data are as follows: swampy meadow along Greer Spring branch, 1 mile north of Greer, Oregon County, Missouri, Aug. 26, 1939, *J. A. Steyermark* 27987.—JULIAN A. STEYERMARK, Field Museum of Natural History.

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#### A PILOSE VARIETY OF DIERVILLA LONICERA.—

DIERVILLA LONICERA Mill., var. **hypomalaca**, var. nov., foliis subtus dense pilosis. ONTARIO: Bear Island, Temagami Forest Reserve, June 28, 1930, *P. V. Krotkov*, no. 5606; Tobemory, Bruce Co., June 22, 1933, *Krotkov*, no. 7808; edge of beach, Pike Bay, Bruce Peninsula, July 17, 1935, *A. S. Pease & E. C. Ogden*, no. 24,852 (TYPE in Gray Herb.). WISCONSIN: near Garrett Bay Inn, Ellison Bay, Door Co., July 9, 1918, *Milton T. Greenman*, no. 20.

Typical wide-ranging *Diervilla lonicera* has the leaves glabrous or at most a little setulose along the midrib beneath. Var. *hypomalaca*, known only from a limited area in the range, is striking on account of the dense white pilosity of the lower surfaces of the leaves.—M. L. FERNALD.

*Volume 42, no. 495, including pages 57-96 and plate 589, was issued 9 March, 1940.*

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